

Service Manual

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Digital Video Cassette Recorder

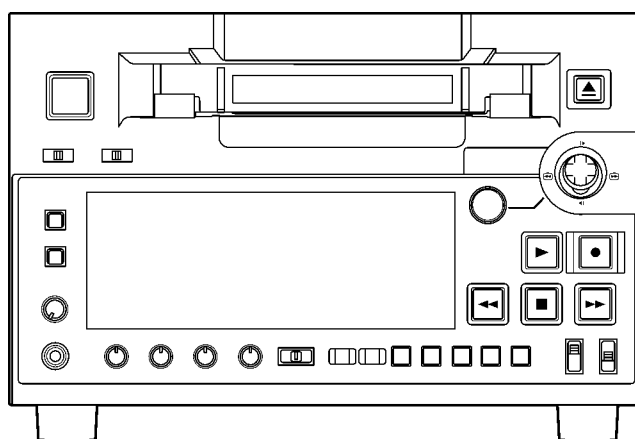
AJ-SD93P/E
AJ-D93MC

Analog Interface Board

AJ-YA93P

SDI Interface Board

AJ-YA94G



Panasonic®

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WARNING


This service information is designed for experienced repair technicians only and is not designed for use by the general public. It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product. Products powered by electricity should be serviced or repaired only by experienced professional technicians. Any attempt to service or repair the product or products dealt with in this service information by anyone else could result in serious injury or death.

AJ-SD93P/E

Specifications

GENERAL

Power supply: AC 100 - 240 V, 50 / 60 Hz
Power consumption: 52 W

 indicates safety information.

Operating ambient temperature:

5 °C to 40 °C (41 °F to 104 °F)

Operating ambient humidity:

10 % to 80 % (no condensation)

Weight:

6.8 kg (14.99 lb)

Dimensions:

214 (W) x 132 (H) x 434 (D) mm
(8 7/16 x 5 3/16 x 17 3/32 inches)
(excluding support legs and connectors)

Recording format:

DVCPRO50/DVCPRO format selectable

Recording video signals:

For AJ-SD93P: 525i system

For AJ-SD93E: 625i system

Recording audio signals:

DVCPRO50 : 48 kHz, 16 bits, 4 channels

DVCPRO : 48 kHz, 16 bits, 2 channels

Recording tracks:

Digital video/audio

Helical track

Time code is recorded in the sub-code area.

Control (CTL): 1 track

Tape speed:

For AJ-SD93P

67.640 mm/sec. (DVCPRO50)

For AJ-SD93E

67.708 mm/sec. (DVCPRO50)

Recording times:

92 minutes (with AJ-5P92LP)

33 minutes (with AJ-5P33MP)

Tapes used:

Metal tapes

FF/REW time:

Less than 3 min. (with AJ-5P92LP)

Less than 2 min. (with AJ-5P33MP)

Digital slow:

-0.43x to +0.43x (DVCPRO, DVCPRO50)

Tape timer accuracy:

±1 frame (when using continuous CTL signal)

Servo lock time:

Less than 0.5 sec. (When the format for 2Fmode, standby ON, or setup menu No. 012 (SYS FORMAT) is the same as the format recorded to the tape)

VIDEO

■ Digital video

Sampling frequency:

Y: 13.5 MHz; PB/PR: 6.75 MHz (DVCPRO50)

Quantizing:

8 bits

Video compression method:

DV-Based compression (SMPTE 314M)

Video compression rate:

DVCPRO50: 1/3.3

DVCPRO : 1/5

Error correction:

Reed-Solomon product code

Bit rate:

DVCPRO50: 50 Mbps

DVCPRO : 25 Mbps

■ Digital IN/Analog Component OUT

Video bandwidth (when using AJ-YA93P, AJ-YA94G options):

For AJ-SD93P

Y : 30 Hz to 5.5 MHz (±1 dB),
5.75 MHz (−2 dB)

PB/PR : 30 Hz to 2.5 MHz (±1 dB),
2.75 MHz (−2 dB)

For AJ-SD93E

Y : 25 Hz to 5.5 MHz (±1 dB),
5.75 MHz (−2 dB)

PB/PR : 25 Hz to 2.5 MHz (±1 dB),
2.75 MHz (−2 dB)

S/N ratio:

Better than 58 dB (Y)

K factor:

Less than 1 % (Y 2T)

Y/PB/PR delay:

Less than 10 nsec.

■ Video input signals

Analog component input (option: AJ-YA93P):

BNC x 3 (Y, PB, PR) (also used as VIDEO IN connectors)

For AJ-SD93P

Y : 1.0 V[p-p]

PB/PR : 0.486/0.7 V[p-p] selectable
(75 Ω, 75 % color bar, 7.5 % setup level)

For AJ-SD93E

Y : 1.0 V[p-p]

PB/PR : 0.7 V[p-p]
(75 Ω, 100 % color bar)

Analog composite input (option: AJ-YA93P):

BNC x 1

VIDEO: 1.0 V[p-p] (75 Ω)

Reference input (option: AJ-YA93P):

Analog composite, BNC x 2, loop-through, 75 Ω

ON/OFF automatically switched

SDI input (option: AJ-YA94G):

BNC x 1,

Compliant with SMPTE 259M-C/ITU-R BT. 656-4 standard

■ Video output signals

Analog component output (option: AJ-YA93P):

BNC x 3 (Y, PB, PR) (switchable with composite outputs)

For AJ-SD93P

Y : 1.0 V[p-p]

PB/PR : 0.486/0.7 V[p-p] selectable
(75 Ω, 75 % color bar, 7.5 % setup level)

For AJ-SD93E

Y : 1.0 V[p-p]

PB/PR : 0.7 V[p-p]
(75 Ω, 100 % color bar)

Analog composite output (option: AJ-YA93P):

BNC x 2, VIDEO1, VIDEO2

SDI output (option: AJ-YA94G):

BNC x 1,

Compliant with SMPTE 259M-C/ITU-R BT. 656-4 standard

Monitor output:

BNC x 1

■ Video adjustment ranges

Video output gain:

±3 dB

Video output chroma gain:

±3 dB

Video output HUE (chroma phase):

±30 °

Video output setup level (black level):

±14 IRE (±100 mV)

Video output sync phase:

±15 μsec.

Video output SC phase:

±180 °

Specifications (continued)

AUDIO

■ Digital Audio

Sampling frequency:

48 kHz (synchronized with video)

Quantizing:

16 bits

Frequency response:

20 Hz to 20 kHz ± 1.0 dB (at reference level)

Dynamic range:

More than 85 dB (1 kHz, emphasis OFF, "A" weighted)

Distortion:

Less than 0.1 % (1 kHz, emphasis OFF, reference level)

Crosstalk:

Less than -80 dB (1 kHz, between 2 channels)

Wow & flutter:

Below measurable limits

Headroom:

For AJ-SD93P: 20 dB

For AJ-SD93E: 18 dB

De-emphasis:

T1=50 μ sec., T2=15 μ sec. (ON/OFF automatically selected)

■ Audio input signals

Analog input (CH1, CH2, CH3, CH4) (option: AJ-YA93P):

XLR x 4, 600 Ω /high impedance selectable, +4/0/-20 dBu selectable

SDI input (option: AJ-YA94G):

BNC x 1,
Compliant with SMPTE 259M-C/272M-A
/ITU-R BT. 656-4 standards

■ Audio output signals

Analog output (CH1, CH2, CH3, CH4) (option: AJ-YA93P):

XLR x 4, low impedance, +4/0/-20 dBu selectable

SDI output (option: AJ-YA94G):

BNC x 1, 75 Ω ,
Compliant with SMPTE 259M-C/272M-A
/ITU-R BT. 656-4 standards

Monitor output:

PHONO x 2, 600 Ω , -8 dBV

Headphone output:

M3, stereo, 8 Ω , variable level

Other Input/Output Connectors

IEEE 1394 digital input/output:

IEEE 1394, 6 pins x 1,
400/200/100 Mbps selectable
Compliant with IEEE 1394-1995 standard
Compliant with IEC61883-Part 1, Part 2
Compliant with SMPTE 396M
AV/C Command Set supported

Time code input (option: AJ-YA93P):

BNC x 1, 0.5 to 8.0 V[p-p], 10 k Ω

Time code output (option: AJ-YA93P):

BNC x 1, low impedance, 2.0 ± 0.5 V[p-p]

RS-422A input/output (option: AJ-YA93P)

D-sub 9-pin, RS-422A interface

Weight and dimensions when shown are approximately.
Specifications are subject to change without notice.

规格

一般规格

供电：AC 100-240 V, 50/60 Hz
耗电量：52 W

指示安全信息。

操作环境温度：

5 °C到40 °C

操作环境湿度：

10 %到80 % (无结露)

重量：

6.8 公斤

尺寸：

214 (宽) × 132 (高) × 434 (深) mm
(不包括支撑腿和端子)

记录格式：

可选择DVCPRO50/DVCPRO格式

记录视频信号：

625i制式

记录音频信号：

DVCPRO50: 48 kHz, 16比特, 4声道

DVCPRO: 48 kHz, 16比特, 2声道

记录磁迹：

数字视频/音频

螺旋形磁迹

时间码被记录在子码区。

控制 (控制信号计数值CTL): 1磁迹

磁带速度：

67.708毫米/秒 (DVCPRO50)

记录时间：

92 分钟 (对于AJ-5P92LP)

33 分钟 (对于AJ-5P33MP)

使用的磁带：

金属磁带

快进 / 倒带时间：

少于3分钟 (对于AJ-5P92LP)

少于2分钟 (对于AJ-5P33MP)

数字慢动作重放：

-0.43倍速到+0.43倍速 (DVCPRO、DVCPRO50)

磁带定时器准确率：

±1帧 (当使用连续CTL信号时)

伺服锁定时间：

少于0.5 秒 (当2F方式, 待机启动ON或设置菜单
No.012 (SYS FORMAT) 的格式与录制到磁带上的
格式相同时)

视频

数字视频

采样频率：

Y: 13.5 MHz; PB/PR: 6.75 MHz (DVCPRO50)

量子化：

8比特

视频压缩方法：

基于DV的压缩 (SMPTE 314M)

视频压缩率：

DVCPRO50: 1/3.3

DVCPRO: 1/5

纠错：

RS-PC纠错编码方式

比特率：

DVCPRO50: 50 Mbps

DVCPRO: 25 Mbps

数字输入 / 模拟分量输出

当安装AJ-YA93P, AJ-YA94G 选购板后的视频带宽：

Y: 25 Hz 到 5.5 MHz (±1 dB),

5.75 MHz (-2 dB)

PB/PR: 25 Hz 到 2.5 MHz (±1 dB),

2.75 MHz (-2 dB)

信噪比：

优于58 dB (Y)

K系数：

小于1 % (Y 2T)

Y/PB/PR 延时：

小于10 nsec.

视频输入信号

模拟分量输入 (可选: AJ-YA93P 板):

BNC × 3 (Y、PB、PR) (也用作VIDEO IN端子)

Y: 1.0 V [p-p]

PB/PR: 0.7 V [p-p]

(75 Ω 100 % 彩条)

模拟复合输入 (可选: AJ-YA93P 板):

BNC × 1

视频: 1.0 V [p-p] (75 Ω)

基准输入 (可选: AJ-YA93P 板):

模拟复合, BNC × 2, 环通, 75 Ω

ON/OFF自动切换

SDI 输入 (可选: AJ-YA94G 板):

BNC × 1, 符合ITU-R BT.656-4标准

视频输出信号

模拟分量输出 (可选: AJ-YA93P 板):

BNC × 3 (Y、PB、PR) (复合输出可切换)

Y: 1.0 V [p-p]

PB/PR: 0.7 V [p-p]

(75 Ω 100 % 彩条)

模拟复合输出 (可选: AJ-YA93P 板):

BNC × 2、VIDEO1、VIDEO2

SDI 输出 (可选: AJ-YA94G 板):

BNC × 1, 符合ITU-R BT.656-4标准

监视器输出：

BNC × 1

视频调节范围

视频输出增益：

±3 dB

视频输出色度增益：

±3 dB

视频输出色度相位：

±30°

视频输出黑电平：

±100 mV

视频输出同步相位：

±15 μsec.

视频输出 SC 相位：

±180°

规格（续）

音频

数字音频

采样频率:

48 kHz (视频同步)

量子化:

16 比特

频率响应:

20 Hz 到 20 kHz ± 1.0 dB (基准电平位)

动态范围:

超过 85 dB (1 kHz, 无加重, "A"加权)

失真:

小于 0.1 % (1 kHz, 无加重, 基准电平)

串音:

小于 -80 dB (1 kHz, 在两个声道间)

低音失真和震颤:

低于可测门限

优先值:

18 dB

去加重:

$T_1 = 50 \mu\text{sec.}$, $T_2 = 15 \mu\text{sec.}$ (自动选择开/关)

音频输入信号

模拟输入 (CH1, CH2, CH3, CH4) (可选: AJ-YA93P 板):

XLR $\times 4$, 600 Ω /高阻可选, +4/0/-20 dBu 可选

SDI 输入 (可选: AJ-YA94G 板):

BNC $\times 1$,

符合 ITU-R BT.656-4 标准

音频输出信号

模拟输出 (CH1, CH2, CH3, CH4) (可选: AJ-YA93P 板):

XLR $\times 4$, 低阻,

+4/0/-20 dBu 可选

SDI 输出 (可选: AJ-YA94G 板):

BNC $\times 1$, 75 Ω ,

符合 ITU-R BT.656-4 标准

监视器输出:

RCA $\times 2$, 600 Ω , -8 dBV

耳机输出:

M3, 立体声, 8 Ω , 多种电平

其它输入 / 输出信号

IEEE 1394 数字输入/输出:

IEEE 1394, 6 芯 $\times 1$, 400/200/100 Mbps 可选

符合 IEEE 1394-1995 标准

符合 IEC 61883 第一部分, 第二部分

符合 SMPTE 396M

支持 AV/C 命令集

时间码输入 (可选: AJ-YA93P 板):

BNC $\times 1$, 0.5 到 8.0 V[p-p], 10 k Ω

时间码输出 (可选: AJ-YA93P 板):

BNC $\times 1$, 低阻, 2.0 ± 0.5 V[p-p]

RS-422A 输入 / 输出 (可选: AJ-YA93P 板)

D-sub 9 芯, RS-422A 接口

所示的重量和尺寸为近似值。
规范如有修改, 恕不另行通知。

AJ-YA93P

Specifications

(Refer to the Operating Instructions of the AJ-SD93 main unit as well.)

Dimensions, weight :

Optional board : 165 (W) x 115 (H) x 15 (D) mm,
113 g

(6 1/2 x 4 17/32 x 19/32 inches,
0.25 lb)

Terminal board : 133 (W) x 123 (H) x 33 (D) mm,
370 g

(5 1/4 x 4 27/32 x 1 5/16 inches,
0.81 lb)

Analog video input :

BNC x 3 (used for both composite and component signals)

Analog video output :

BNC x 3 (used for both composite and component signals)

Analog audio input : XLR x 4

Analog audio output : XLR x 4

REF input :

BNC x 1; loop-through : BNC x 1

TC input : BNC x 1

TC output : BNC x 1

REMOTE connector : RS-422A, D-sub 9-pin x 1

AJ-YA94G

Specifications

(Refer to the Operating Instructions of the AJ-SD93 main unit as well.)

Dimensions, weight :

Dimensions: 28 (W) x 123 (H) x 181 (D) mm, 120 g

(1 1/8 x 4 27/32 x 7 1/8 inches, 0.27 lb)

Video/audio input :

BNC x 1, compliant with SMPTE 259M-C/SMPTE 272M-A/ITU-R BT. 656-4 standards

Video/audio output :

BNC x 1, compliant with SMPTE 259M-C/SMPTE 272M-A/ITU-R BT. 656-4 standards

SAFETY PRECAUTIONS

GENERAL GUIDELINES

1. When servicing, observe the original lead dress. If a short circuit is found, replace all parts, which have been over-heated or damaged by the short circuit.
2. After servicing, see to it that all the protective devices such as insulation barriers, insulation papers shields are properly installed.
3. After servicing, make the following leakage current checks to prevent the customer from being exposed to shock hazards.

LEAKAGE CURRENT COLD CHECK

1. Unplug the AC cord and connect a jumper between the two prongs on the plug.
2. Measure the resistance value, with an ohm meter, between the jumpered AC plug and each exposed metallic cabinet part on the equipment such as screwheads, connectors, control shafts, etc. The resistance value must be more than $5M\Omega$.

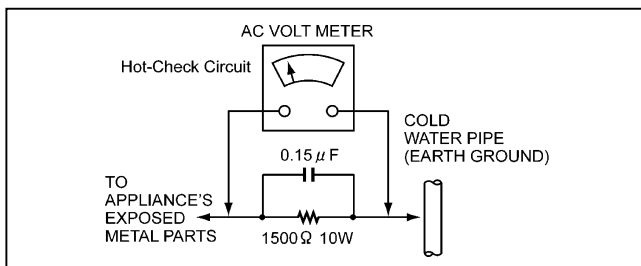


Figure1

LEAKAGE CURRENT HOT CHECK (See Figure 1)

1. Plug the AC cord directly into the AC outlet. Do not use an isolation transformer for this check.
2. Connect a $1.5K\Omega$, 10W resistor, in parallel with a $0.15\mu F$ capacitor, between each exposed metallic part on the set and a good earth ground such as a water pipe, as shown in Figure1.
3. Use an AC voltmeter, with 1000 ohms/volt or more sensitivity, to measure the potential across the resistor.
4. Check each exposed metallic part, and measure the voltage at each point.
5. Reverse the AC plug in the AC outlet repeat each of the above measurements.
6. The potential at any point should not exceed 0.15 volts RMS. A leakage current tester (Simpson Model 229 equivalent) may be used to make the hot checks, leakage current must not exceed 0.1 milliamp. In case a measurement is outside of the limits specified, there is a possibility of a shock hazard, and the equipment should be repaired and rechecked before it is returned to the customer.

ABOUT LEAD FREE SOLDER (PbF)

Distinction of PbF PCB:

PCBs (manufactured) using lead free solder will have a PbF stamp on the PCB.

Caution:

1. Pb free solder has a higher melting point than standard solder; Typically the melting point is $50-70^{\circ}F$ ($30-40^{\circ}C$) higher. Please use a high temperature soldering iron. In case of the soldering iron with temperature control, please set it to $700\pm 20^{\circ}F$ ($370\pm 10^{\circ}C$).
2. Pb free solder will tend to splash when heated too high (about $1100^{\circ}F/600^{\circ}C$).

ELECTROSTATICALLY SENSITIVE (ES) DEVICES

Some semiconductor (solid state) devices can be damaged easily by static electricity. Such components commonly are called Electrostatically sensitive (ES) Devices. Examples of typical ES devices are integrated circuits and some field-effect transistors and semiconductor "chip" components. The following techniques should be used to help reduce the incidence of component damage caused by static electricity.

1. Immediately before handling any semiconductor component or semiconductor-equipped assembly, drain off any electrostatic charge on your body by touching a known earth ground.

Alternatively, obtain and wear a commercially available discharging wrist trap device, which should be removed for potential shock reasons prior to applying power to the unit under test.

2. After removing an electrical assembly equipped with ES devices, place the assembly on a conductive surface such as aluminum foil, to prevent electrostatic charge buildup or exposure of the assembly.
3. Use only a grounded tip soldering iron to solder or unsolder ES devices.
4. Use only an anti-static solder removal device classified as "anti-static" can generate electrical charges sufficient to damage ES devices.
5. Do not use freon-propelled chemicals. These can generate electrical charges sufficient to damage ES devices.
6. Do not remove a replacement ES device from its protective package until immediately before you are ready to install it.
(most replacement ES devices are package with leads electrically shorted together by conductive foam, aluminum foil or comparable conductive material).
7. Immediately before removing the protective material from the leads of a replacement ES device, touch the protective material to the chassis or circuit assembly into which the device will be installed.
CAUTION: Be sure no power is applied to the chassis or circuit, and observe all other safety precautions.
8. Minimize bodily motions when handling unpackaged replacement ES devices. (Otherwise harmless motion such as the brushing together of your clothes fabric or the lifting of your foot from a carpeted floor can generate static electricity sufficient to damage an ES device).

X-RADIATION

WARNING

1. The potential source of X-radiation in EVF sets is the High Voltage section and the picture tube.
2. When using a picture tube test jig for service, ensure that jig is capable of handling 10kV without causing X-Radiation.

Note: It is important to use an accurate periodically calibrated high voltage meter.

3. Measure the High Voltage. The meter (electric type) reading should indicate 2.5kV, $\pm 0.15kV$. If the meter indication is out of tolerance, immediate service and correction is required to prevent the possibility of premature component failure. To prevent an X-Radiation possibility, it is essential to use the specified picture tube.

IMPORTANT

“Unauthorized recording of copyrighted television programmes, video tapes and other materials may infringe the right of copyright owners and be contrary to copyright laws.”

**CAUTION**

**RISK OF ELECTRIC SHOCK
DO NOT OPEN**



CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT REMOVE COVER (OR BACK). NO USER-SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.



The lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of uninsulated “dangerous voltage” within the product’s enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.



The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

■ **THIS APPARATUS MUST BE GROUNDED**

To ensure safe operation the three-pin plug must be inserted only into a standard three-pin power outlet which is effectively grounded through normal household wiring.

Extension cords used with the equipment must be three-core and be correctly wired to provide connection to the ground. Incorrectly wired extension cords can be extremely hazardous.

The fact that the equipment operates satisfactorily does not imply that it is grounded, and the installation is not necessarily safe. For your safety, if in any doubt about the effective grounding of the equipment or power outlet, please consult a qualified electrician.

CAUTION:

TO COMPLETELY DISCONNECT THIS APPARATUS FROM THE AC MAINS, DISCONNECT THE POWER SUPPLY CORD PLUG FROM THE AC RECEPTACLE. THE AC OUTLET (MAIN SOCKET) SHALL BE INSTALLED NEAR THE EQUIPMENT AND SHALL BE EASILY ACCESSIBLE.

WARNING:

TO REDUCE THE RISK OF FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS EQUIPMENT TO RAIN OR MOISTURE.

TO REDUCE THE RISK OF FIRE OR SHOCK HAZARD, KEEP THIS EQUIPMENT AWAY FROM ALL LIQUIDS-USE AND STORE ONLY IN LOCATIONS WHICH ARE NOT EXPOSED TO THE RISK OF DRIPPING OR SPLASHING LIQUIDS, AND DO NOT PLACE ANY LIQUID CONTAINERS ON TOP OF THE EQUIPMENT.

CAUTION:

Do not install or place this deck in a bookcase, built-in cabinet or any other confined space in order to maintain adequate ventilation. Ensure that curtains and any other materials do not obstruct the ventilation to prevent risk of electric shock or fire hazard due to overheating.

CAUTION:

TO REDUCE THE RISK OF FIRE OR SHOCK HAZARD AND ANNOYING INTERFERENCE, USE THE RECOMMENDED ACCESSORIES ONLY.

CAUTION:

TO REDUCE THE RISK OF FIRE OR SHOCK HAZARD, REFER MOUNTING OF THE OPTIONAL INTERFACE BOARD TO QUALIFIED SERVICE PERSONNEL.

CAUTION:

TO REDUCE THE RISK OF FIRE OR SHOCK HAZARD, REFER CHANGE OF SWITCH SETTING INSIDE THE DECK TO QUALIFIED SERVICE PERSONNEL.

FCC Note:

This equipment has been tested and found to comply with the limits for a class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Warning: To assure continued FCC emission limit compliance, the user must use only shielded interface cables when connecting to external units. Also any unauthorized changes or modifications to this equipment could void the user’s authority to operate it.

CAUTION:

This apparatus can be operated at a voltage in the range of 100 – 240 V AC.

Voltage other than 120 V is not intended for U.S.A. and Canada.

CAUTION:

Operation at a voltage other than 120 V AC may require the use of a different AC plug. Please contact either a local or foreign Panasonic authorized service center for assistance in selecting an alternate AC plug.

CAUTION:

Even when the Power Switch is in the OFF position, a small current flows the filter circuit.

Caution for AC Mains Lead

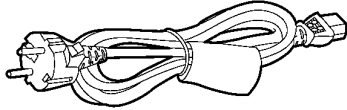
FOR YOUR SAFETY PLEASE READ THE FOLLOWING TEXT CAREFULLY.

This product is equipped with 2 types of AC mains cable. One is for continental Europe, etc. and the other one is only for U.K.

Appropriate mains cable must be used in each local area, since the other type of mains cable is not suitable.

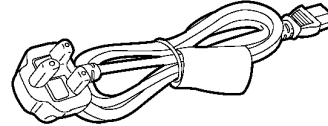
FOR CONTINENTAL EUROPE, ETC.

Not to be used in the U.K.



FOR U.K. ONLY

If the plug supplied is not suitable for your socket outlet, it should be cut off and appropriate one fitted.



FOR U.K. ONLY

This appliance is supplied with a moulded three pin mains plug for your safety and convenience.

A 13 amp fuse is fitted in this plug.

Should the fuse need to be replaced please ensure that the replacement fuse has a rating of 13 amps and that it is approved by ASTA or BSI to BS1362.

Check for the ASTA mark  or the BSI mark  on the body of the fuse.

If the plug contains a removable fuse cover you must ensure that it is refitted when the fuse is replaced.

If you lose the fuse cover the plug must not be used until a replacement cover is obtained.

A replacement fuse cover can be purchased from your local Panasonic Dealer.

IF THE FITTED MOULDED PLUG IS UNSUITABLE FOR THE SOCKET OUTLET IN YOUR HOME THEN THE FUSE SHOULD BE REMOVED AND THE PLUG CUT OFF AND DISPOSED OF SAFELY. THERE IS A DANGER OF SEVERE ELECTRICAL SHOCK IF THE CUT OFF PLUG IS INSERTED INTO ANY 13 AMP SOCKET.

If a new plug is to be fitted please observe the wiring code as shown below.


If in any doubt please consult a qualified electrician.

WARNING: THIS APPLIANCE MUST BE EARTHED.

IMPORTANT: The wires in this mains lead are coloured in accordance with the following code:

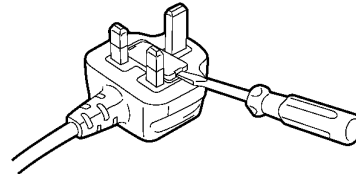
Green-and-Yellow:	Earth
Blue:	Neutral
Brown:	Live

As the colours of the wires in the mains lead of this appliance may not correspond with the coloured markings identifying the terminals in your plug, proceed as follows:

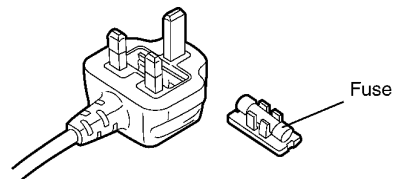
- The wire which is coloured GREEN-AND-YELLOW must be connected to the terminal in the plug which is marked with the letter E or by the Earth symbol  or coloured GREEN or GREEN-AND-YELLOW.
- The wire which is coloured BLUE must be connected to the terminal in the plug which is marked with the letter N or coloured BLACK.
- The wire which is coloured BROWN must be connected to the terminal in the plug which is marked with the letter L or coloured RED.

How to replace the fuse

1. Open the fuse compartment with a screwdriver.



2. Replace the fuse.



For AJ-SD93E

IMPORTANT

“Unauthorized recording of copyrighted television programmes, video tapes and other materials may infringe the right of copyright owners and be contrary to copyright laws.”

Operating precaution

Operation near any appliance which generates strong magnetic fields may give rise to noise in the video and audio signals. If this should be the case, deal with the situation by, for instance, moving the source of the magnetic fields away from the unit before operation.

■ THIS APPARATUS MUST BE EARTHED

To ensure safe operation the three-pin plug must be inserted only into a standard three-pin power point which is effectively earthed through the normal household wiring.

Extension cords used with the equipment must be three-core and be correctly wired to provide connection to earth. Wrongly wired extension cords are a major cause of fatalities.

The fact that the equipment operates satisfactorily does not imply that the power point is earthed and that the installation is completely safe. For your safety, if in any doubt about the effective earthing of the power point, consult a qualified electrician.

■ DO NOT REMOVE PANEL COVER BY UNSCREWING.

To reduce the risk of electric shock, do not remove cover. No user serviceable parts inside.

Refer servicing to qualified service personnel.

CAUTION:

TO COMPLETELY DISCONNECT THIS APPARATUS FROM THE AC MAINS, DISCONNECT THE POWER SUPPLY CORD PLUG FROM THE AC RECEPTACLE. THE AC OUTLET (MAIN SOCKET) SHALL BE INSTALLED NEAR THE EQUIPMENT AND SHALL BE EASILY ACCESSIBLE.

WARNING:

TO REDUCE THE RISK OF FIRE OR SHOCK HAZARD, KEEP THIS EQUIPMENT AWAY FROM ALL LIQUIDS-USE AND STORE ONLY IN LOCATIONS WHICH ARE NOT EXPOSED TO THE RISK OF DRIPPING OR SPLASHING LIQUIDS, AND DO NOT PLACE ANY LIQUID CONTAINERS ON TOP OF THE EQUIPMENT.

CAUTION:

TO REDUCE THE RISK OF FIRE OR SHOCK HAZARD AND ANNOYING INTERFERENCE, USE THE RECOMMENDED ACCESSORIES ONLY.

CAUTION:

TO REDUCE THE RISK OF FIRE OR SHOCK HAZARD, REFER MOUNTING OF THE OPTIONAL INTERFACE BOARD TO AUTHORIZED SERVICE PERSONNEL.

CAUTION:

TO REDUCE THE RISK OF FIRE OR SHOCK HAZARD, REFER CHANGE OF SWITCH SETTING INSIDE THE DECK TO QUALIFIED SERVICE PERSONNEL.

CAUTION:

Do not install or place this deck in a bookcase, built-in cabinet or any other confined space in order to maintain adequate ventilation. Ensure that curtains and any other materials do not obstruct the ventilation to prevent risk of electric shock or fire hazard due to overheating.

CAUTION:

Even when the Power Switch is in the OFF position, a small current flows the filter circuit.

AJ-YA93P

The AJ-YA93P is an analog interface board which is specifically designed to be used with the AJ-SD93 digital VTR.

As such, it cannot be used with any other VTR.

To install the board in the AJ-SD93, consult your dealer.

CAUTION:

TO REDUCE THE RISK OF FIRE OR SHOCK HAZARD, REFER MOUNTING OF THE OPTIONAL INTERFACE BOARD TO AUTHORIZED SERVICE PERSONNEL.

AJ-YA94G

This product is a SDI interface board which is specifically designed to be used with the AJ-SD93 digital VTR.

To install the board in the AJ-SD93, consult your dealer.

CAUTION:

TO REDUCE THE RISK OF FIRE OR SHOCK HAZARD, REFER MOUNTING OF THE OPTIONAL INTERFACE BOARD TO AUTHORIZED SERVICE PERSONNEL.

Panasonic®

SECTION 1

SERVICE INFORMATION

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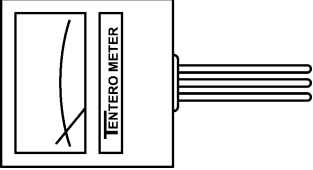
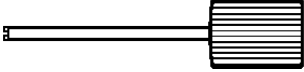
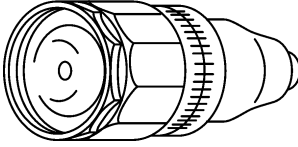
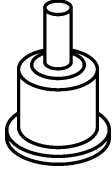
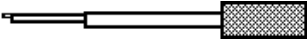
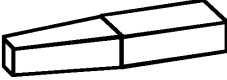
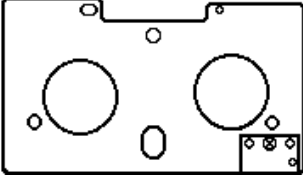

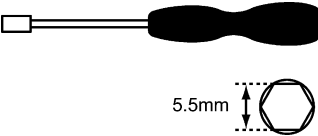
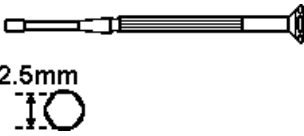
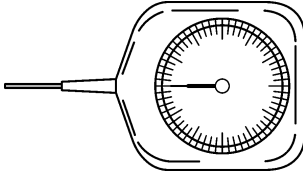
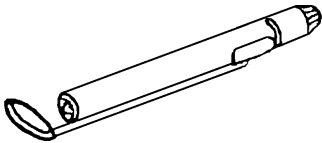
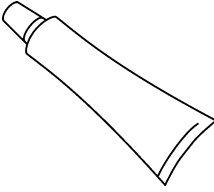
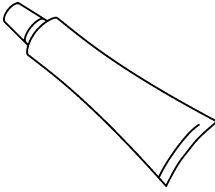
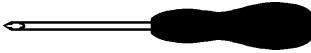
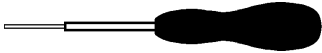
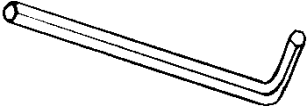
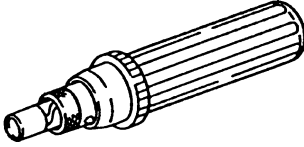
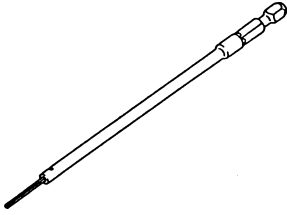

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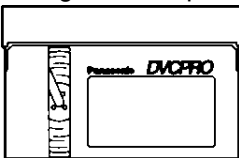
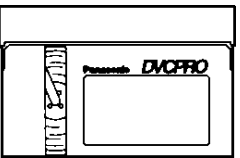
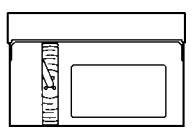
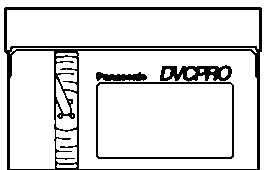
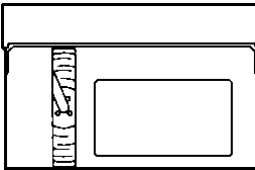
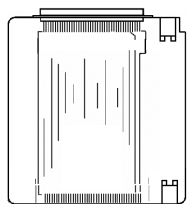
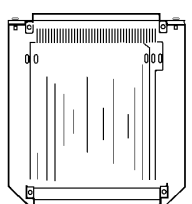
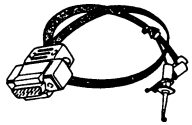
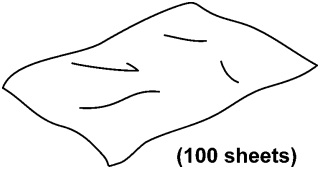
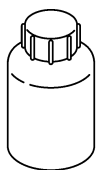
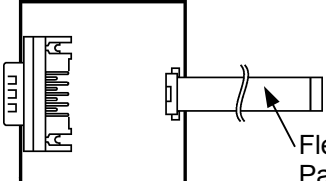
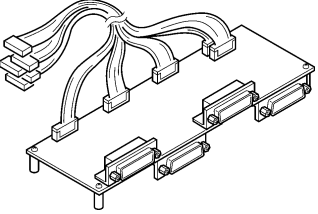
1. SERVICING FIXTURES & TOOLS

NO	NEW	PART NO.	FIXTURE & TOOL NAME	REMARKS
1		VFK1145A	Back Tension Meter	
2		VFK1149B	Post Driver	
3		VFK71A	Dial Torque Gauge (1.5 cN·m)	150 g
4		VFK1191A	Dial Torque Gauge (0.45 cN·m)	45 g
5		VFK1152	Dial Torque Gauge Adapter	
6		VFK0357	Eccentric Screwdriver (1.5 mm)	
7		VFK1154	Post Height Fixture	
8		VFK1153	Mech. Neutral Plate	
9		VFK1155	REV Position Tool (silver)	
10		VFK1156	PLAY Position Tool (black)	
11		VFK1208	Neutral Position Tool (black with hole)	
12		VFK1150A	Nut Driver (5.5 mm)	
13		VFK1151	Nut Driver (2.5 mm)	
14		VFK1188A	Dial Tension Gauge	
15		VFK0948A	Check Light	
16		VFK0749	Froiral Grease (white)	for plastics part
17		MOR265	Morlytone Grease (black)	for metal part
18		VFK1146A	Philips Driver (Fine) (00-75)	
19		VFK1147A	Philips Driver (Fine) (00-100)	
20		VFK1148A	Hex. Driver (1.5 mm)	
21		VFK1178A	Hex. Driver (0.89 mm)	
22		VFK1179A	Hex. Driver (0.71 mm)	
23		VFK1190	Hex. Wrench	
24		VFK1209A	Torque Driver (4 cN·m-30 cN·m)	0.4 kgf·cm –3 kgf·cm
25		VFK1375	Post Axis Driver (1.5 mm)	
26		VFK1300	A/D Board (DAQ-12 Quatech)	
27		VFM3580KM	DVCPRO Alignment Tape (No.1)	or VFM3580KL (NTSC)
27		VFM3680KM	DVCPRO Alignment Tape (No.1)	or VFM3680KL (PAL)
28		VFM3581KM	DVCPRO Alignment Tape (No.2)	or VFM3581KL (NTSC)
28		VFM3681KM	DVCPRO Alignment Tape (No.2)	or VFM3682KL (PAL)
29		VFM3582KM	DVCPRO Alignment Tape (No.3)	or VFM3582KL (NTSC)
29		VFM3682KM	DVCPRO Alignment Tape (No.3)	or VFM3682KL (PAL)
30		VFM3380KM	DVCPRO50 Alignment Tape	(NTSC)
30		VFM3480KM	DVCPRO50 Alignment Tape	(PAL)
31		VFM3010EDS	DV Alignment Tape (Color Bars)	or VFM3010EDL (NTSC)
31		VFM3110EDS	DV Alignment Tape (Color Bars)	or VFM3110EDL (PAL)
32		VFM3000EDS	DV Alignment Tape for LISTA	or VFM3000EDL
33		AJ-CL12MP	Cleaning Tape	SALES Route
34		VFK1423	Tape Beg./End Detection Cassette	
35		VFK1498	Extender Board (160 pin)	
36		VFK1193	Extender Board (96 pin)	
37		VFK1186	LISTA Cable	
38		VZZ0095	Cleaning Cloth	100 sheets.
39		VFK0906	Lubrication Oil	
40		VFK1304A	Flash Memory Version up Tool	
41		VFK1590	CPLD Writer	
42				

* The following adjustment software can be downloaded from the Web site.

S1		VFK1248N	Flash Memory Version-up Software	
S2		VFK1481K	LISTA Software	
S3		VFK1922	RF Auto Adjustment Software	

1 VFK1145A Back Tension Meter 	2 VFK1149B Post Driver 	3 VFK71A 4 VFK1191A Dial Torque Gauge 	5 VFK1152 Dial Torque Gauge Adapter 
6 VFK0357 Eccentric Screwdriver (1.5 mm) 	7 VFK1154 Post Height Fixture 	8 VFK1153 Mech. Neutral Plate 	9 VFK1155 (REV/Silver) 10 VFK1156 (PLAY/Black) 11 VFK1208 (Neutral/Black with hole) Position Tool 
12 VFK1150A Nut Driver (5.5 mm) 	13 VFK1151 Nut Driver (2.5 mm) 	14 VFK1188A Dial Tension Gauge 	15 VFK0948A Check Light 
16 VFK0749 Froiral Grease (for plastics) 	17 MOR265 Morlytone Grease (for metal) 	18 VFK1146A (00X75) 19 VFK1147A (0X100) Philips Driver (Fine) 	20 VFK1148A (1.5 mm) 21 VFK1178A (0.89 mm) 22 VFK1179A (0.71 mm) Hex. Driver 
23 VFK1190 Hex. Wrench 	24 VFK1209A Torque Driver 	25 VFK1375 Post Axis Driver (1.5 mm) 	26 VFK1300 A/D Board (Quatech DAQ-12) 

<p>27 VFM3580KM or KL (NTSC) 28 VFM3680KM or KL (PAL) 29 VFM3581KM or KL (NTSC) VFM3681KM or KL (PAL) VFM3582KM or KL (NTSC) VFM3682KM or KL (PAL) DVCPRO Alignment Tape</p> 	<p>30 VFM3380KM (NTSC) VFM3480KM (PAL) DVCPRO50 Alignment Tape</p> 	<p>31 VFM3010EDS or EDL(NTSC) VFM3110EDS or EDL (PAL) DV Alignment Tape (Color Bars)</p> <p>32 VFM3000EDS or EDL DV Alignment Tape (LISTA)</p> 	<p>33 AJ-CL12MP Cleaning Tape</p> 
<p>34 VFK1423 Tape Beg./End Detection Cassette</p> 	<p>35 VFK1498 F Extender Board</p> 	<p>36 VFK1193 Extender Board</p> 	<p>37 VFK1186 LISTA Cable</p> 
<p>38 VZZ0095 Cleaning Cloth</p>  <p>(100 sheets)</p>	<p>39 VFK0906 Lubrication Oil</p> 	<p>40 VFK1304A Flash Memory Version-up Tool (VFK1304 includes the flexible cable "VWJ20E5500L0")</p>  <p>Flexible cable Part No.: VWJ20E5500L0</p>	
<p>41 VFK1590 C PLD Writer</p> <p>Cables to the boards VFK1590P1, VFK1590P2, VFK1590P3, VFK1590P4 and VFK1590P5 included.</p> 			

2. ALIGNMENT TAPE

2-1. VFM3580KM / KL (NTSC) (25M adjustment tape)

TIME (min.)	VIDEO		PCM AUDIO		CUE	
	Signal	Purpose	Signal	Purpose	Signal	Purpose
0:00	Color bar SMPTE(75%)	Confirmation of the composite video level	1KHz -20dB	Confirmation of the audio level	1KHz 0VU	Confirmation of the cue level
7:00	Color bar (75%)	Confirmation of the composite video level				
14:00	H sweep	Frequency characteristic			6KHz 0VU	A/C head azimuth adjustment
18:00	Bow tie (500K)	Y/C timing			300, 500, 1K 2K, 4K, 6KHz	Frequency characteristic
22:00	Pulse & bar	Y/C timing				
26:00	Area marker	Video start timing			-----	-----

2-2. VFM3581KM / KL (NTSC) (Manufacturer (LISTA) adjustment tape)

TIME (min.)	VIDEO		PCM AUDIO		CUE	
	Signal	Purpose	Signal	Purpose	Signal	Purpose
0:00	ITI pattern	Linearity adjustment	-----	-----	-----	-----

2-3. VFM3582KM / KL (NTSC) (Manufacturer (X-value) adjustment tape)

TIME (min.)	VIDEO		PCM AUDIO		CUE	
	Signal	Purpose	Signal	Purpose	Signal	Purpose
0:00	Color bar (75%) (with drop-out track)	X-value adjustment	-----	-----	6KHz 10VU	X-value adjustment

2-4. VFM3380KM (NTSC) (50M adjustment tape)

TIME (min.)	VIDEO		PCM AUDIO		CUE	
	Signal	Purpose	Signal	Purpose	Signal	Purpose
0:00	Color bar (with teletext) (100%)	Confirmation of video level and teletext level	1KHz -20dB	Confirmation of the audio level	1KHz 0VU	Confirmation of the cue level
4:00	Color bar (75%)	Confirmation of the video level				
7:00	Multiburst (Y/Pb/Pr)	Frequency characteristic				
10:00	Multiburst (only Y)	Y-frequency characteristic				
13:00	Bow tie	Y/C timing				
16:00	Area marker	Video start timing				

2-5. VFM3010EDS / EDL (NTSC) (DV adjustment tape)

TIME (min.)	VIDEO		PCM AUDIO		CUE	
	Signal	Purpose	Signal	Purpose	Signal	Purpose
0:00	Color bar	EQ adjustment	1,102.5KHz		-----	-----

2-6. VFM3000EDS / EDL (NTSC/PAL) (DV (LISTA) adjustment tape)

TIME (min.)	VIDEO		PCM AUDIO		CUE	
	Signal	Purpose	Signal	Purpose	Signal	Purpose
0:00	LISTA signal	Adjustment of the linearity	-----	-----	-----	-----

2-7. VFM3680KM / KL (PAL) (25 M adjustment tape)

TIME (min.)	VIDEO		PCM AUDIO		CUE	
	Signal	Purpose	Signal	Purpose	Signal	Purpose
0:00	Color bar 100%	Video level Confirmation	1KHz –18dB	Confirmation of the audio level	1KHz Reference Level	Cue Level Confirmation
10:00	H Sweep	Frequency Response			6KHz Reference Level	A/C head Azimuth Adjustment
14:00	Area Markers	Video start timing				
18:00	Bow tie (500K)	Y/C timing			1KHz 300KHz-6KHz	Frequency Response
22:00	Pulse & bar	Y/C timing				
26:00 30:00	Multi Pulse	Y/C timing	-----	-----	-----	-----

2-8. VFM3681KM / KL (PAL) (Manufacturer (LISTA) adjustment tape)

TIME (min.)	VIDEO		PCM AUDIO		CUE	
	Signal	Purpose	Signal	Purpose	Signal	Purpose
0:00	ITI pattern	Linearity adjustment	-----	-----	-----	-----

2-9. VFM3682KM / KL (PAL) (Manufacturer (X-value) adjustment tape)

TIME (min.)	VIDEO		PCM AUDIO		CUE	
	Signal	Purpose	Signal	Purpose	Signal	Purpose
0:00	Color bar (75%) (with drop-out track)	X-value adjustment	-----	-----	6KHz 10VU	X-value adjustment

2-10. VFM3480KM (PAL) (50M adjustment tape)

TIME (min.)	VIDEO		PCM AUDIO		CUE	
	Signal	Purpose	Signal	Purpose	Signal	Purpose
0:00	Color bar (with teletext) (100%)	Confirmation of video level and teletext level	1KHz –20dB	Confirmation of the audio level	1KHz 0VU	Confirmation of the cue level
4:00	Color bar (75%)	Confirmation of the video level				
7:00	Multiburst (Y/Pb/Pr)	Frequency characteristic				
10:00	Multiburst (only Y)	Y-frequency characteristic				
13:00	Bow tie	Y/C timing				
16:00	Area marker	Video start timing				

2-11. VFM3110EDS / EDL (PAL) (DV adjustment tape)

TIME (min.)	VIDEO		PCM AUDIO		CUE	
	Signal	Purpose	Signal	Purpose	Signal	Purpose
0:00	Color bar	EQ adjustment	1,102.5KHz		-----	-----

3. LIST OF RECOMMENDED MEASURING INSTRUMENTS

MODEL NO. (Example)	NAME	REMARK
TSG130A (NTSC) *1(opt.05)	NTSC analog composite & component signal generator (with CF OUT)	Tektronix
TSG131A (PAL)	PAL analog composite & component signal generator (with CF OUT)	
1760 (op. SC) or 1780R	SCH meter (NTSC)	
	Waveform monitor (NTSC)	
	Vector scope (NTSC)	
1761 (op. SC) or 1781R	SCH meter (PAL)	
	Waveform monitor (PAL)	
	Vector scope (PAL)	
	Oscilloscope	
	Digital voltmeter (D.V.M.)	
	Frequency counter	
	Audio noise meter	
	Audio analyzer	
	Spectrum analyzer	

*1 : This option 05 is added for dvcpro service test signal. It include CF OUT Signal.
Please contact Tektronix if more detailed information is required.

4. MAINTENANCE

4-1. Maintenance Schedule

Maintenance is done by periodically performing suitable maintenance servicing in order to maintain the functions always in best condition, so that the user can use the equipment safely. Video equipment with mounted mechanisms wear parts, and their wear and deterioration cause troubles. Dust and dirt also can impair stable operation. For this reason it is important not to just perform repair at the time of trouble, but also to perform suitable maintenance at regular intervals.

	Part name	Part No.	Hours of use (unit: hours)				
			Every 1000	3000	6000	9000	12,000
-	Cleaning of the travel system	-----	C: Every 500 hours				
-	Mechanical chassis unit	VXY1731Z1					R
1	Cylinder Unit	VEG1501		R	R	R	IM
2	Pinch Arm Unit	VXL2835C		R, G	R, G	R, G	IM
3	Cleaning Arm Unit	VXL3027C	R, Y	R, Y	R, Y	R, Y	IM
4	S-Reel Motor Unit	VEM0686			R		IM
5	T-Reel Motor Unit	VEM0687			R		IM
6	Thrust Screw Unit	VXQ0556			R, L		IM
7	Mode SW Unit	VES0918C			R		IM
8	S1 Loading Arm Unit	VXL2812			R		IM
9	T1 Boat Unit	VXA6379			R		IM
10	S5 Post Base Unit	VXA7361			R		IM
11	Tension Arm Unit	VXL2832			R		IM
12	A/C Head	VED0419					IM
13	Loading Motor (1) Arm Unit	VEM0645C					IM
14	Reel Drive Motor Unit	VEM0585C					IM
15	Pinch Solenoid	VSJ0227					IM
16	S Brake Solenoid	VSJ0216					IM
17	T Brake Solenoid	VSJ0216					IM
18	Distinction SW Unit (MIC SENSOR)	VXA7014C					IM
19	Cleaner Solenoid	VSJ0226					IM
20	Main Cam Gear	VDG1168					IM
21	M Stopper Brake Solenoid	VSJ0216					IM
22	Front-loading unit	VXA7347					R
23	Front Loading Motor	VXA5597					F
24	Fan motor	L6FAHBB0001	Exchange after every 12,000 h of energization				

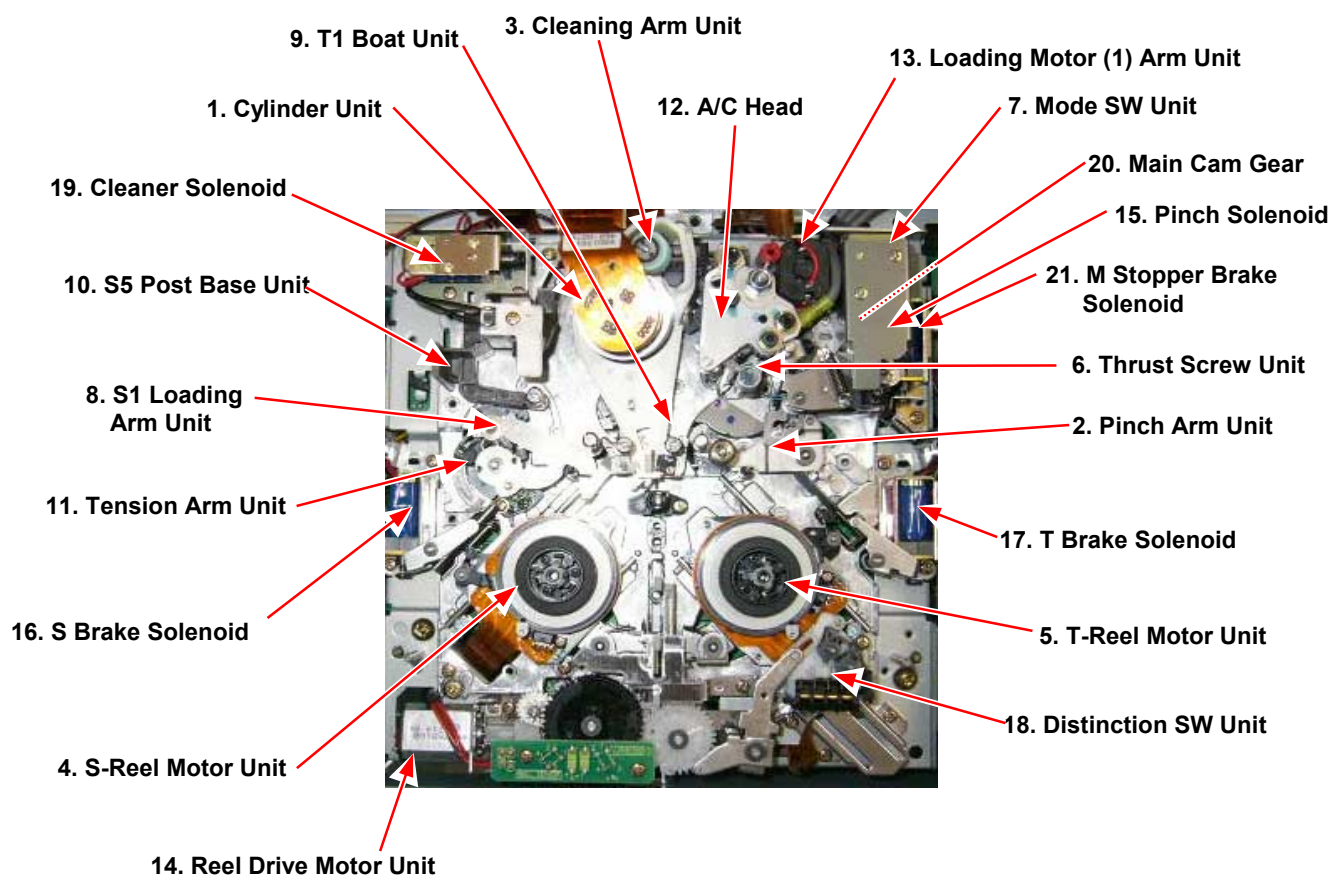
Replacement of the mechanical chassis unit is recommended for the 12,000 h maintenance.

- C** : Perform cleaning.
R : Assembly subject to exchange.
Y : The timing of replacement with Cleaning Arm Unit, either 1000 hours or 1 year as timing come earlier.
G : At the time of exchange, wipe off the old grease and apply new grease. (Morlytone grease)
L : Lubrication is necessary.
IM : Included in the mechanical chassis unit.
 When the mechanical chassis unit is not exchanged, exchange as a single part is required.
F : Included in the front-loading unit.

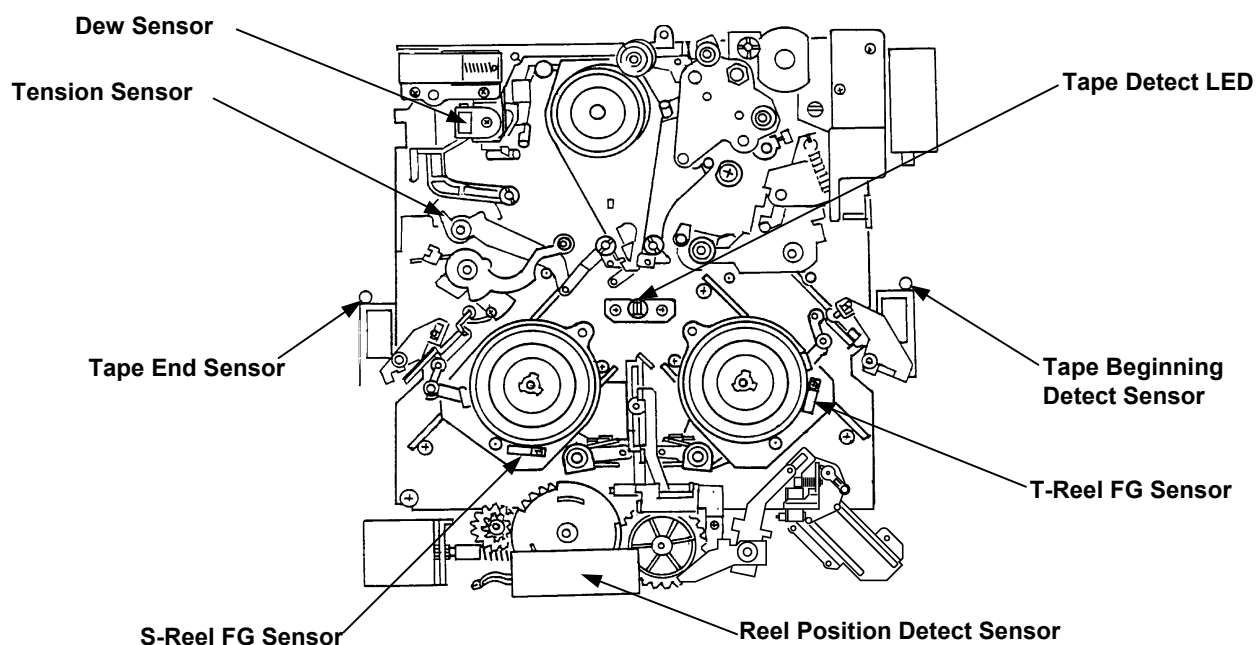
<Note:>

The Hours of use is indicated by the cylinder rotation time (DRUM RUN). The maintenance execution time shown in the chart is recommendation for standard maintenance execution. This is not the Life of the various parts. The Life is influenced by temperature, humidity, dust, etc. Please refer to the most recent execution outline, as the maintenance specifications and the part numbers may change.

4-2. Layout of the Maintenance Parts



4-3. Layout of the Other Parts



5. MANUAL TAPE EJECT (Emergency Eject)

When a tape can not be ejected by normal operation due to a problem, the tape can be removed manually as follows.

1. Turn off power and remove the top Case Unit.
2. Rotate the red plastic screw with a Phillips-head screwdriver counterclockwise pushing the screw down. It needs to rotate until Post starts moving. (about 30 times rotation).

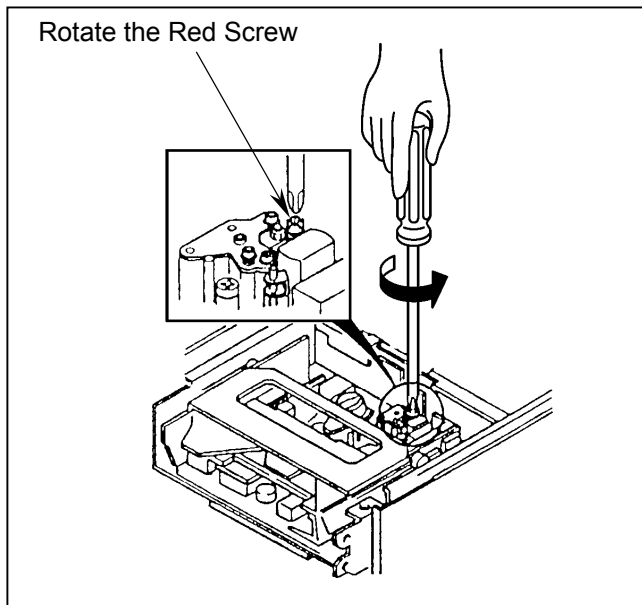


Figure 5-1. Post unloading

4. Repeat item 2 and 3 until the tape wound up completely inside of the cassette.
5. When the tape is completely gotten inside of the cassette, rotate the red screw in front of the worm gear of the cassette down motor clockwise with a philips-head screwdriver pushing the screw down. Remove the cassette with care not to pinch the tape by cassette lid when it is closed.

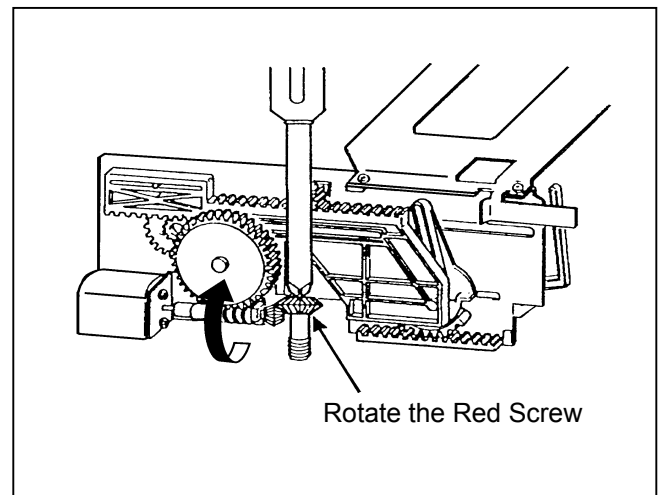


Figure 5-3. Cassette unloading

3. Since tape slack will occur when the post is unloaded, rotate the supply reel to wind up the tape.
How to wind up the tape (see Figure 5-2)
 - a. Insert the rubber side of the take-up jig to the cassette lid opening position from mechanism side.
 - b. Turn the flange of the supply reel in the direction of winding to eliminate the tape slack. (Take care not to damage the tape in the process.)

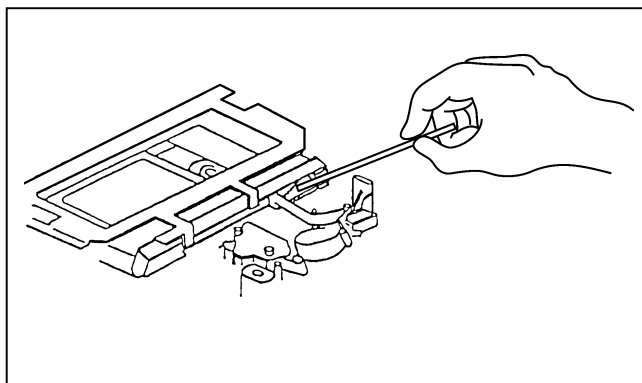


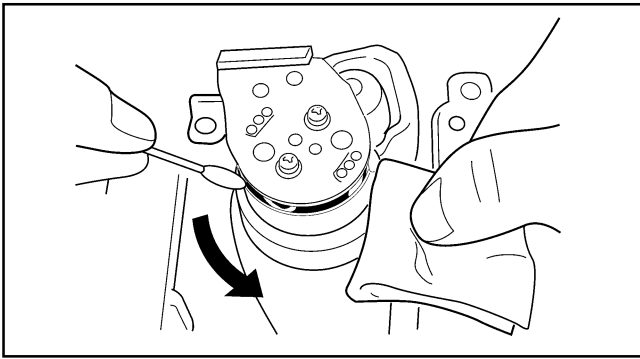
Figure 5-2. Rotate the S Reel

6. Cleaning Method

Note: Turn the power OFF during cleaning.
Make sure the power is OFF before cleaning.
Use ethanol (more than 99% purity) as cleaning liquid.

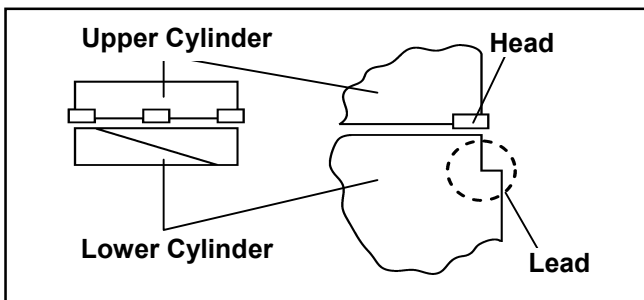
6-1. Cylinder Head Cleaning Method: (Daily)

1. Turn power off.
2. Dip cloth into De-natural Alcohol.
3. Press cleaning cloth gently against Cylinder Head. Using an applicator on the top edge of the Upper Cylinder, rotate the Cylinder counter-clockwise several times to clean.
4. Repeat cleaning procedure until all residue is removed from Cylinder Head.



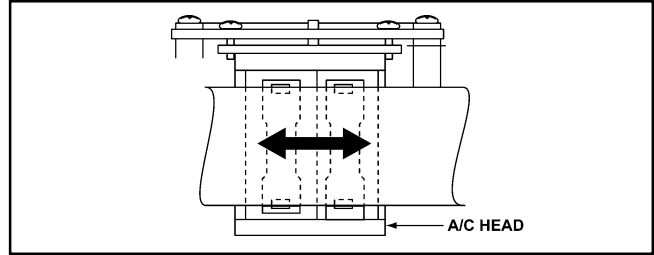
6-2. Cylinder Lead Cleaning Method: (Weekly)

Don't touch a head chip. Clean the drum lead with a pick.



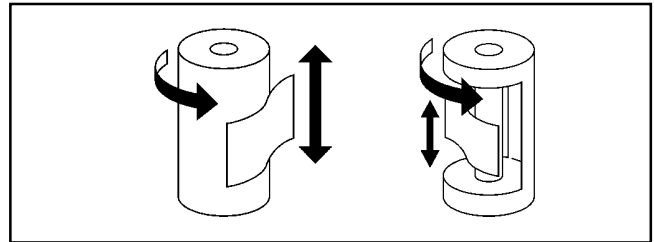
6-3. A/C Head Cleaning Method: (Weekly)

Wipe the A/C head with a cloth dipped in cleaning liquid. Wipe again with a dry cloth.



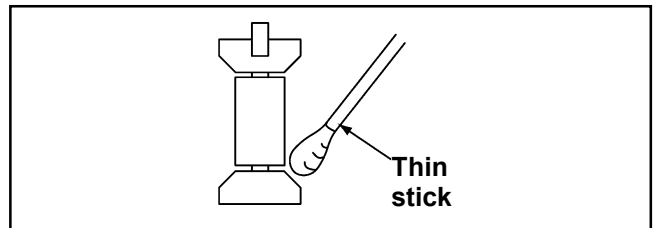
6-4. Pinch Roller and Capstan Shaft Cleaning Method: (Weekly)

Wipe the Pinch Roller and Capstan with a cloth dipped in cleaning liquid.



6-5. Post Cleaning Method: (Weekly)

Wrap a cloth on a pick. Wipe each posts with that pick. Wipe again with a dry cloth. For metal posts wipe with a cloth dipped in cleaning liquid. Then wipe it again with dry cloth.



Notes :

Use the clean cloth for cleaning purpose. Do not use a dirty cloth.

The cleaning cloth can be ordered from the parts department.

The part number is indicated below.

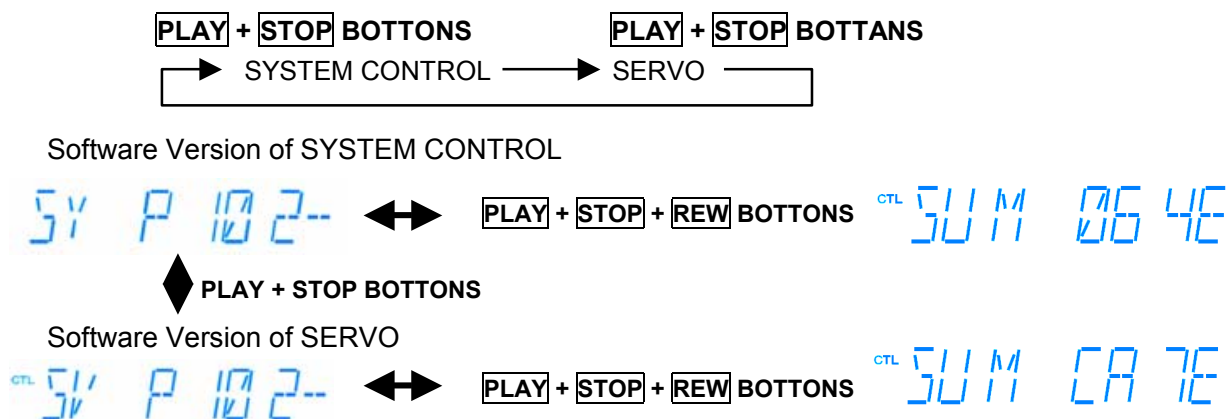
CLEANING CLOTH : VZZ0095

7. SOFTWARE VERSION DISPLAY

7-1. SOFTWARE and PLD VERSION are displayed on the VIDEO SUPER OUT (Monitor TV) and FRONT DISPLAY.

7-1-A. Microcomputer Software Version on Front Display

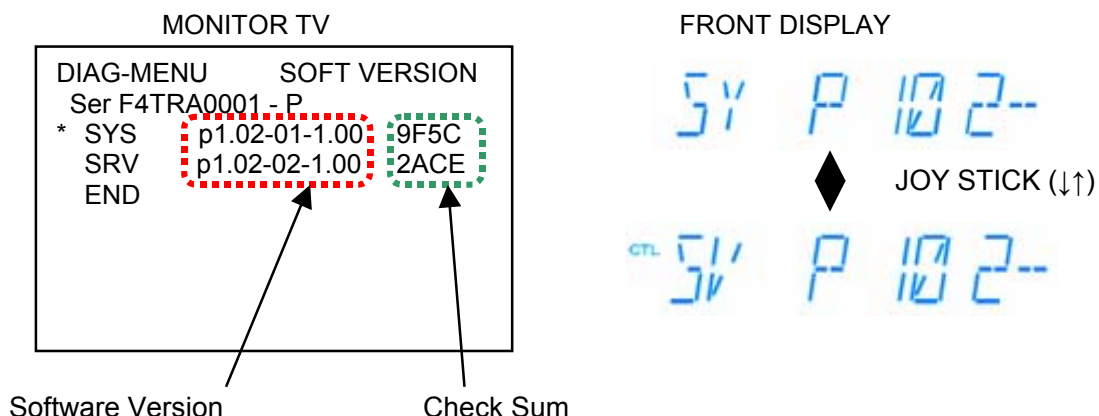
1. Turn on the VTR power.
2. Place the unit in the EJECT mode and then press the "PLAY" and "STOP" buttons together so that the Software Version of the SYSTEM CONTROL (SY) is displayed on the Front Display.
3. Press the "PLAY" and "STOP" buttons again, then the the version display is changed to the Software Version of the Servo (SV).



4. Press the PLAY, STOP and REW buttons together, then the Check Sum is displayed as shown the above.

7-1-B. Microcomputer Software Version Display

1. Turn on the power of the VTR and place it in the EJECT mode..
2. Press the "PLAY" + "STOP" buttons and "FP" + "MENU" buttons simultaneously so that the monitor TV shows the HOUR METER display.
3. Press the Search button so that the Software Version of the Microcomputer is displayed as shown below.



4. Move the cursor (*) by using the Joy Stick (↑↓) so that the display on the Front Panel is changed as shown the above.

7-1-C. PLD Software Version Display

- 1. Perform the previous steps and display the Version of the Microcomputer Software.
- 2. Press the SERCH button so that the Software of the PLD (FPG) is displayed as shown below.

MONITOR TV

DIAG-MENU

Ser F4TRA0001 - P

* SERVO VSI4319A 1-0

AVMON VSI4323B 1-4 2829

DVPRC VSI4322B 1-1 D7F8

AVPRC VSI4321C 1-0 F0C0

D-I/F VSI4324B 1-0 B042

AVIO VSI4326B 1-3 6207

SDI VSI4327A 1-0 DCD3

FND

PLD VERSION

Check Sum

Software Number

Factory Control Number

SOFTWARE	FRONT DISPLAY
SERVO	SV 4319A
AVMON	MN 4323B
DVPRC	DP 4322B
AVPRC	AP 4321C
D-I/F	DI 4324B
AVIO	IO 4326B
SDI	SI 4327A

- 3. Move the cursor (*) by using the Joy Stick (↑↓) so that the PLD version is displayed on the Front Panel as shown the above.

Note: If the optional boards AJ-YA93 and AJ-YA94G are not installed, the monitor TV shows "AVIO -----" and "SDI -----".

8. ERROR RATE DISPLAY

- Condition : 1) Set to Service menu.
2) Set the TCG SW to INT REGEN or INT PRESET.

The error rate is displayed on the AUDIO LEVEL METER in the Service menu mode.
(When enters in the Service menu mode, the AUDIO LEVEL METER changes into the error display mode automatically.)

1. DVCPRO 50 PB HEAD } The error rate is displayed and measured on the AUDIO
DVCPRO 25 PB HEAD } LEVEL METER at the first page (main screen) of Service
DV RP HEAD } menu mode (refer to figure 8-1)

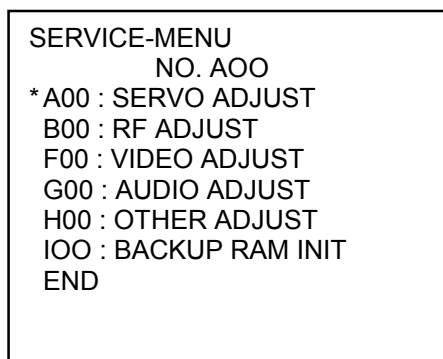


Figure 8-1

2. DVCPRO 50 / DVCPRO 25 : RP HEAD
 - 1) Enter into the RF adjustment menu and select RP HEAD.
 - 2) The error rate is displayed on the AUDIO LEVEL METER.
3. Specification of Error Rate

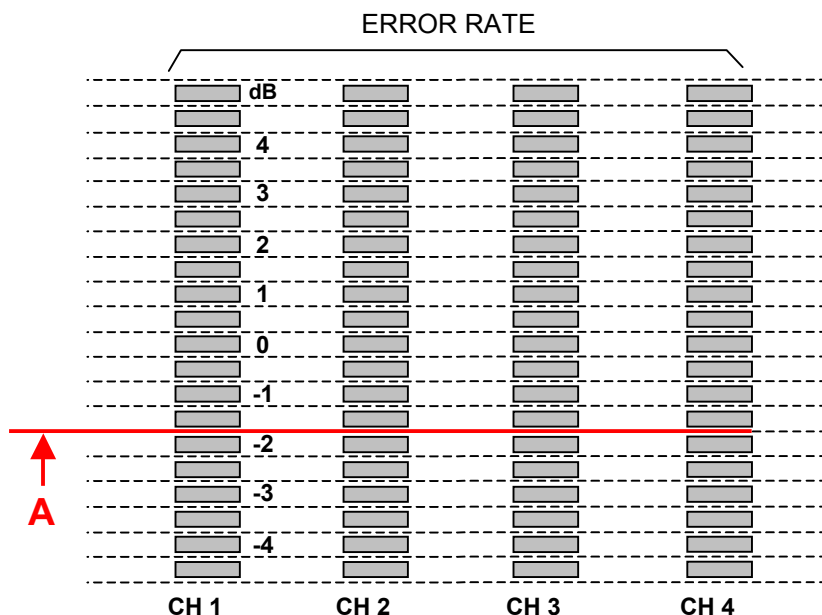


Figure 8-2

DVCPRO50/DVCPRO25

ATF HEAD	TCG SW	CH 1	CH 2	CH 3	CH 4
PB	INT REGEN	PBL1 VIDEO	PBL2 VIDEO	PBR1 VIDEO	PBR2 VIDEO
	INT PRESET	PBL1 AUDIO	PBL2 AUDIO	PBR1 AUDIO	PBR2 AUDIO
RP	INT REGEN	RPL1 VIDEO	RPL2 VIDEO	RPR1 VIDEO	RPR2 VIDEO
	INT PRESET	RPL1 AUDIO	RPL2 AUDIO	RPR1 AUDIO	RPR2 AUDIO

DV

ATF HEAD	TCG SW	CH 1	CH 2	CH 3	CH 4
RP	INT REGEN	RPL1 VIDEO	RPL2 VIDEO	RPR1 VIDEO	RPR2 VIDEO
	INT PRESET	RPL1 AUDIO	RPL2 AUDIO	RPR1 AUDIO	RPR2 AUDIO

TCG SW

INT REGEN	VIDEO Error rate is displayed
INT PRESET	AUDIO Error rate is displayed

Specification of Error Rate

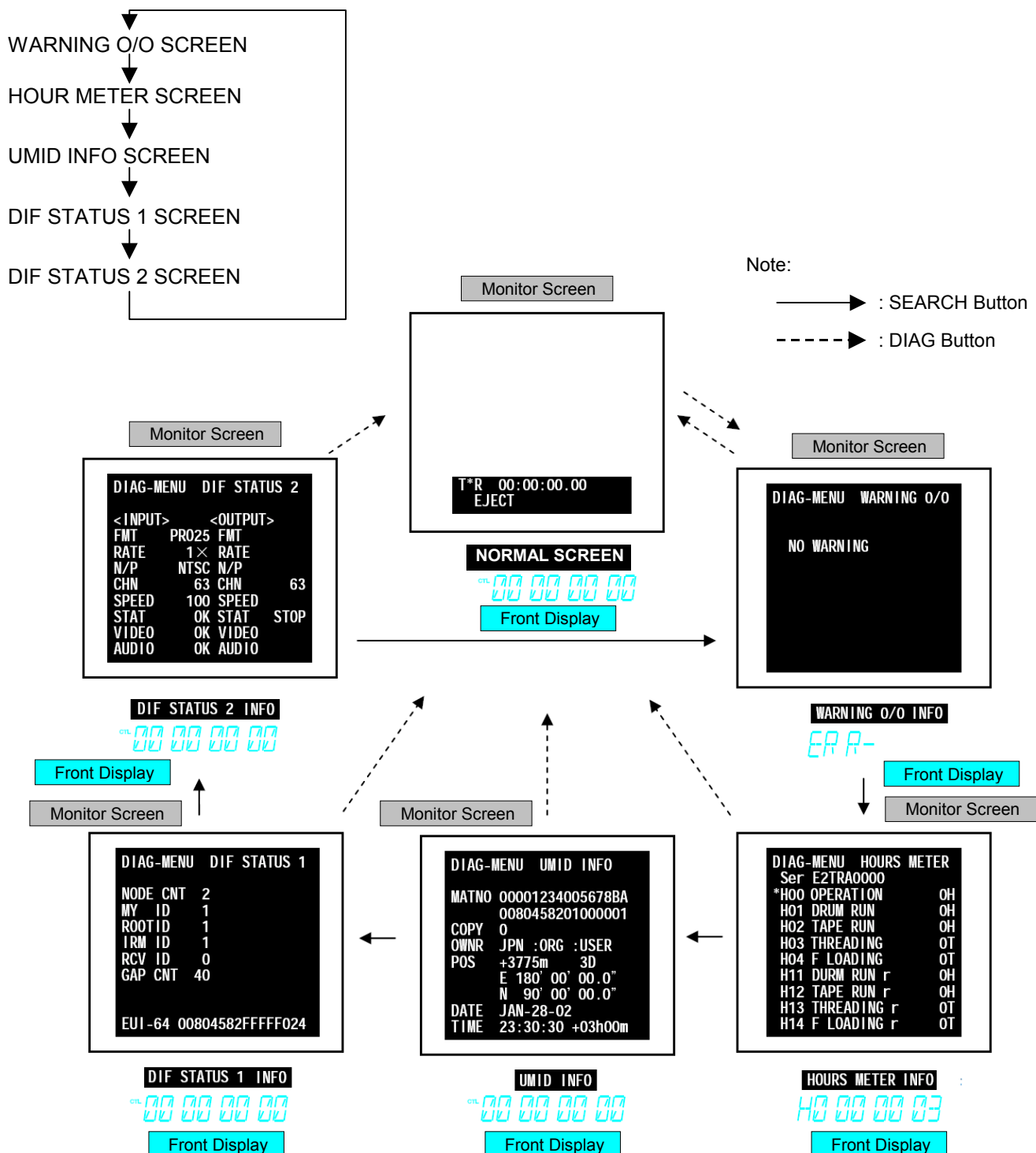
	VTR mode	Specification of Error Rate
DVCPRO (All Modes)	DVCPRO (PB Head) alignment tape playback	Under the "A" position at level meter
DV (Rec/PB Modes)	DV (RP Head) Alignment tape playback	Under the "A" position at level meter

9. DIAG MENU DISPLAY

The DIAG-MENU is the menu for investigating the status of the VTR, and it has the indicated information.

- Warning display (WARNING information)
- Hour meter display (HOUR METER information)
- UMID display (UMID information)
- DIF status display (DIF STATUS 1 and 2 information)

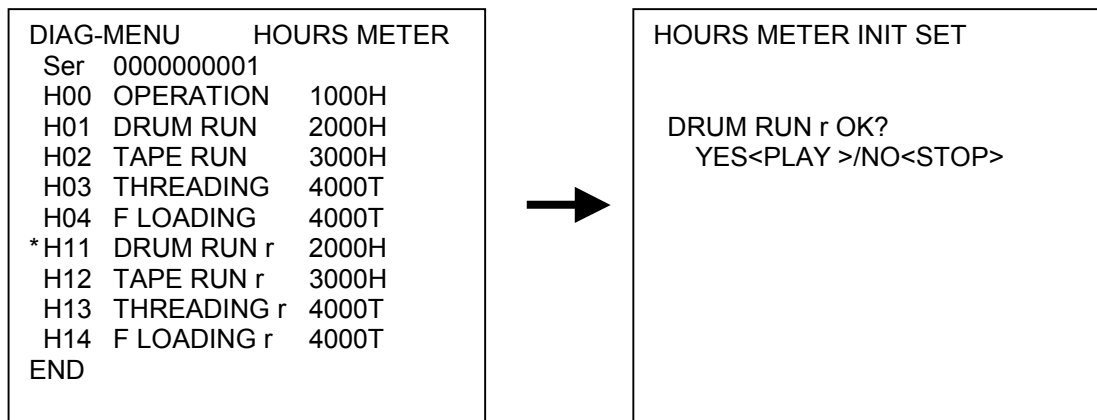
1. Press the “**DIAG**” button so that the above information is displays on the monitor and Front Display.
2. Press the “**SEARCH**” button in order to change the display as shown below.



3. The Diag Menu is closed by pressing the “**DIAG**” button again.

<< Hours Meter Reset Procedure >>

1. Press the **“EJECT”** + **“STOP”** and **“PF”** + **“MENU”** buttons on the Front Panel simultaneously so that the display shows the **“HOURS METER”** as shown below.
2. Then move the cursor (*) to the item with **“r”** to be reset.
3. Press the **“RESET”** button on the Front Panel so that the display changes as shown below. After the following confirmation message is displayed, move the cursor (*) to the item to reset by controlling the Joy Stick. (Only H11 – H14 with **“ r ”** can be reset.)
4. When confirming the message **“* * * * *r OK?”**, press the **“PLAY”** button on the Front Panel, the data (**H) for the item where the cursor is located will be reset.
5. Press the **“MENU”** button simultaneously press the **“PF”** button so that the VTR returns to the normal screen.



10. TP & MAIN SIGNAL FOR TAPE PATH CONFIRMATION

TP6302	R/P-L or PB-L ENVELOPE Signal (RF/CUE Board)
TP233	R/P-L-HSW Signal (SERVO Board)

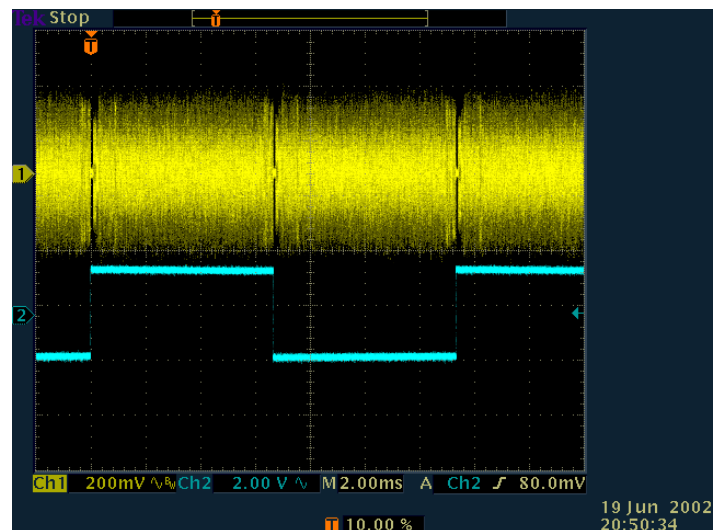


Figure 10-1

TP6502	R/P-R or PB-R ENVELOPE Signal (RF/CUE Board)
TP235	P/R-R-HSW Signal (SERVO Board)

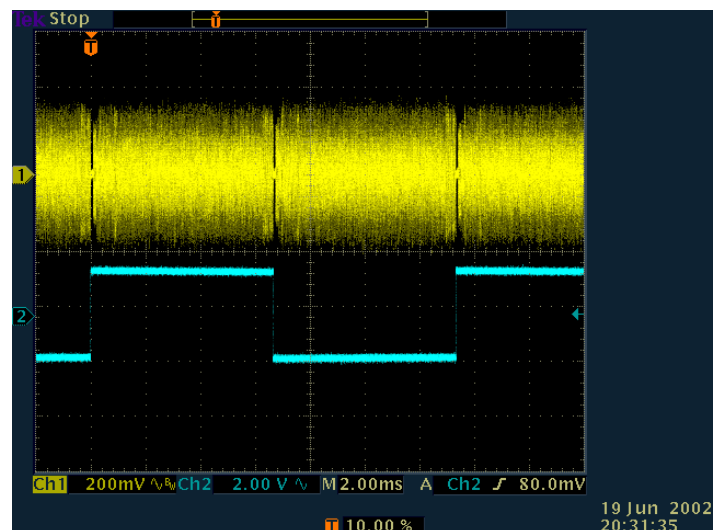


Figure 10-2

TP6302	R/P-L or PB-L ENVELOPE Signal (RF/CUE Board)
TP233	R/P-L-HSW Signal (SERVO Board)
TP4102	CUE Signal (RF/CUE Board)

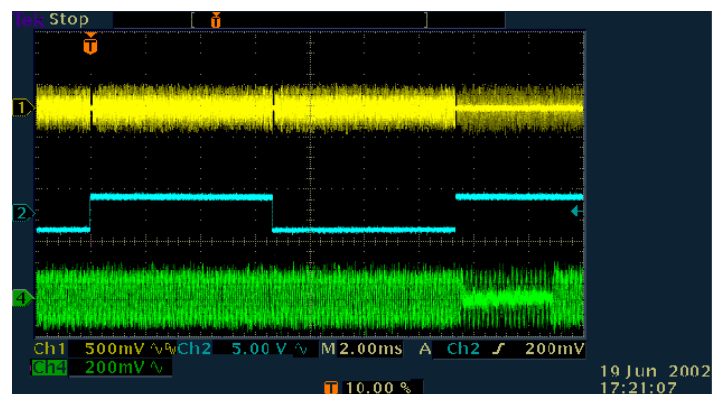
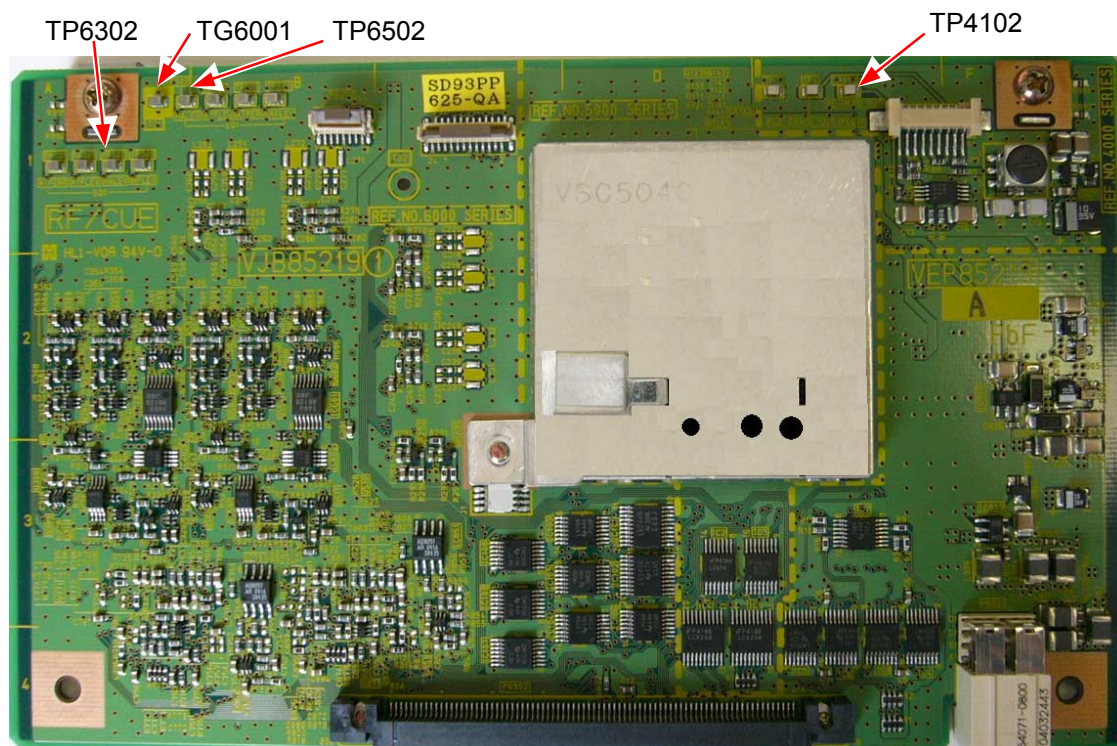


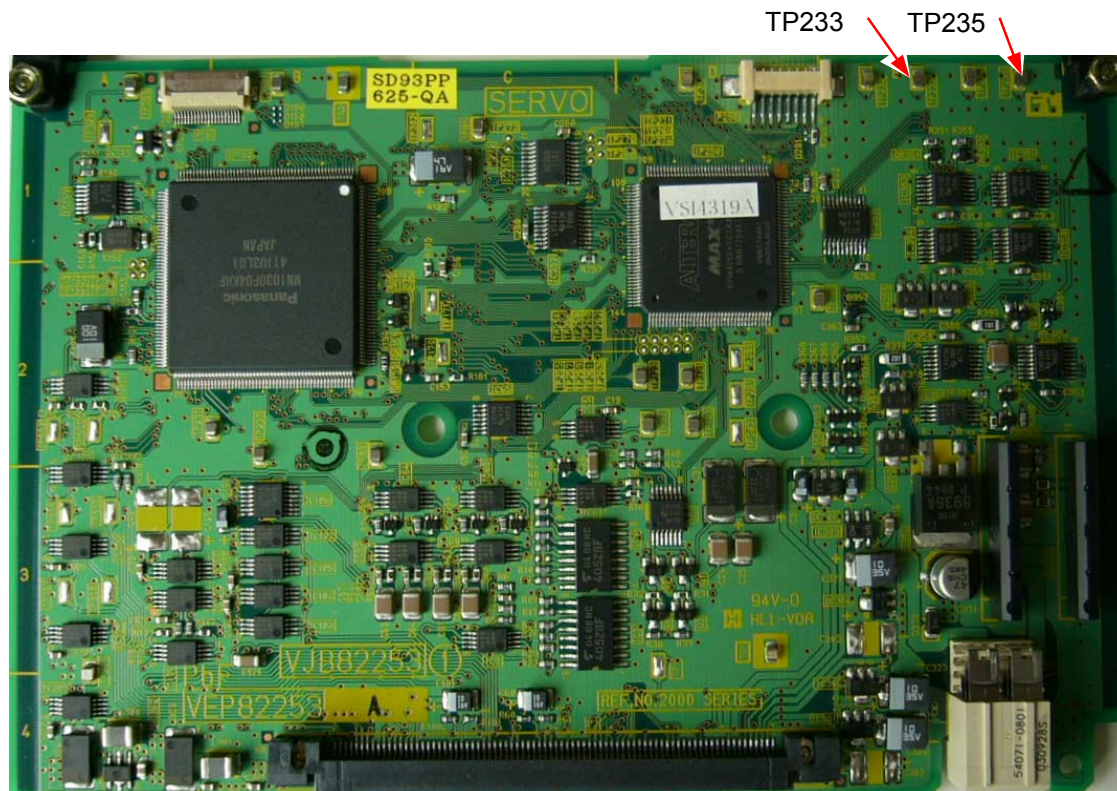
Figure 10-3

RF/CUE Board



(COMPONENT SIDE)

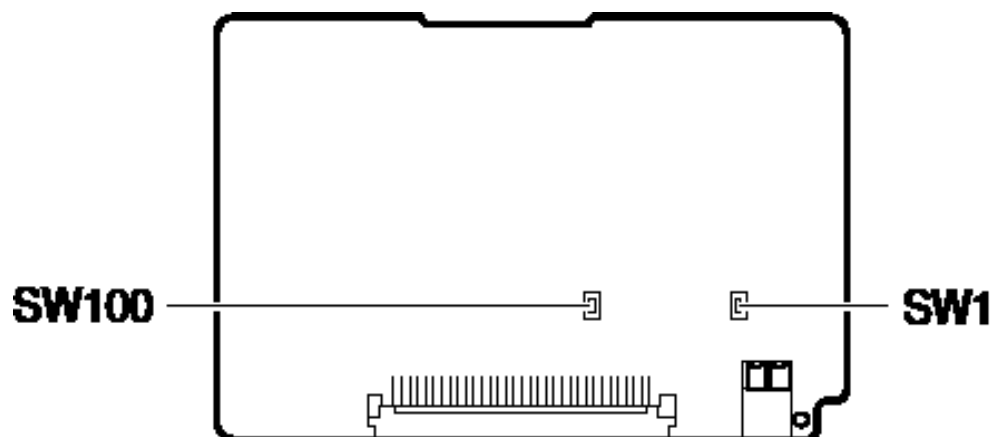
SERVO Board



(COMPONENT SIDE)

11. INTERNAL SWITCH SETTING

The switch setting on the AVIO board (part of AJ-YA93) is as shown below.



Switch no.	Purpose of setting
SW1	AUDIO INPUT IMPEDANCE SW For setting the audio input impedance of channels 1 and 2 <u>HIGH/600 Ω</u>
SW100	AUDIO INPUT IMPEDANCE SW For setting the audio input impedance of channels 3 and 4 <u>HIGH/600 Ω</u>

The underlined item denotes the factory setting.

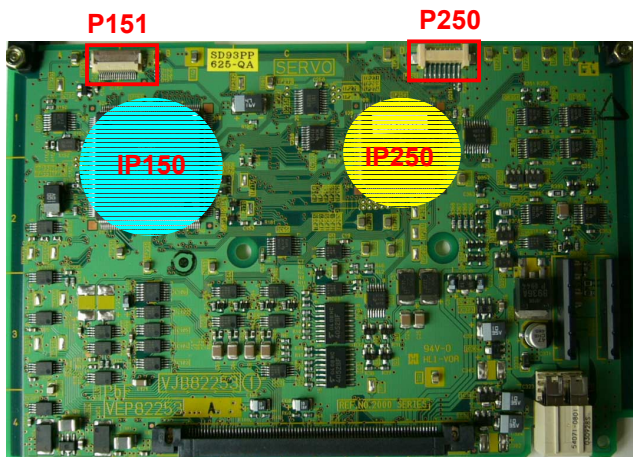
12. SOFTWARE VERSION UPGRADE METHOD

12-1. Microcomputer (FLASH) / PLD Chart

Name of Circuit Board	Name	IC Manufacture	Ref. No.	Version up Connector	Version up Soft. & Tool	No. of Program Software	Paragraph of Procedures
F1 : SERVO	CPLD	ALTERA	IP250	P250	1. Flash Memory Version-up Tool (VFK1304A)	VSI4319	12-2-5
	Microcomputer FLASH	Panasonic	IP150	P151		VSI4318	12-2-3
F2 : AVMON	AVMON FPG	ALTERA	IC3200	P1802 On the DPROC Board	2. Version-up Software (VFK1248N) 3. CPLD Writer (VFK1590) 4. CPLD Version-up Software (Max Plus II supplied from ALTERA)	VSI4323	12-2-4
F3 : DPROC	Microprocessor FLASH (NTSC) FLASH (PAL)	Panasonic	IC1603			VSI4320 VSI4328	12-2-2
	AVPROC FPG	ALTERA	IC I201, 901			VSI4321	12-2-4
	DVPROC FPG	ALTERA	IC1501			VSI4322	12-2-4
	D-I/F FPG	ALTERA	IC10501			VSI4324	12-2-4
F4 : AVIO	AVIO FPG	ALTERA	IC3400			VSI4326	12-2-4
F5 : SDI	SDI FPG	ALTERA	IC255			VSI4327	12-2-4

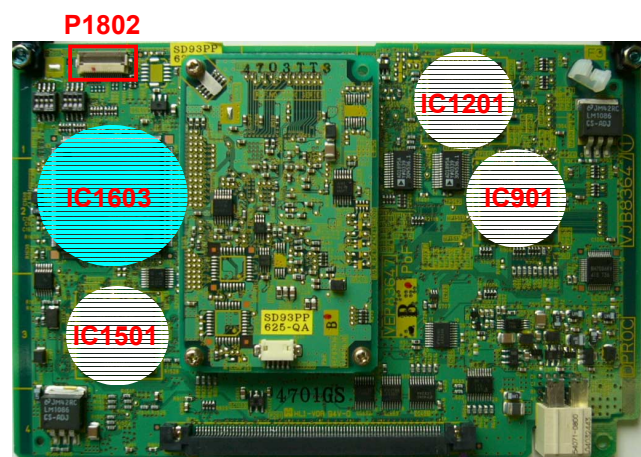
Table 12-1A-1

F1: SERVO Board



(COMPONENT SIDE)

F3: DPROC Board



(COMPONENT SIDE)

F2: AVMON Board



(COMPONENT SIDE)

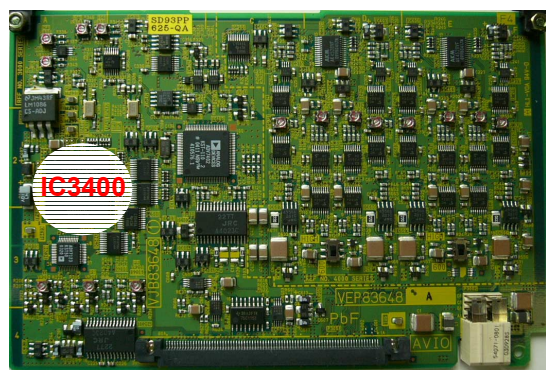
F3 (SUB): 1394 MODULE Board



(COMPONENT SIDE)

Figure 12-1A-2

F4: AVIO Board (AJ-YA93G)



F5: SDI Board (AJ-YA94)

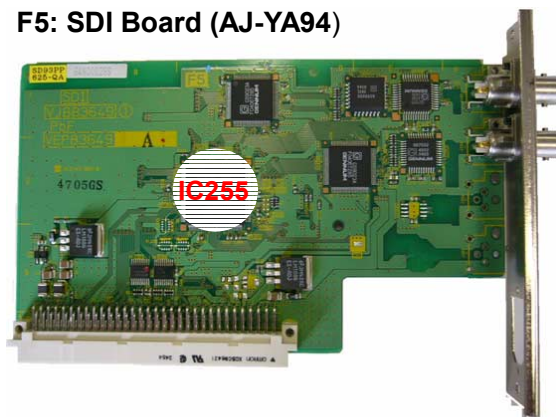


Figure 12-1A-3

12-2. Flash ROM / FPG Software Version Upgrade Procedure

Connect the VTR with personal computer by RS232C cable (Cross cable) and Flash Memory Version-up Tool (VFK1304A) as shown below.

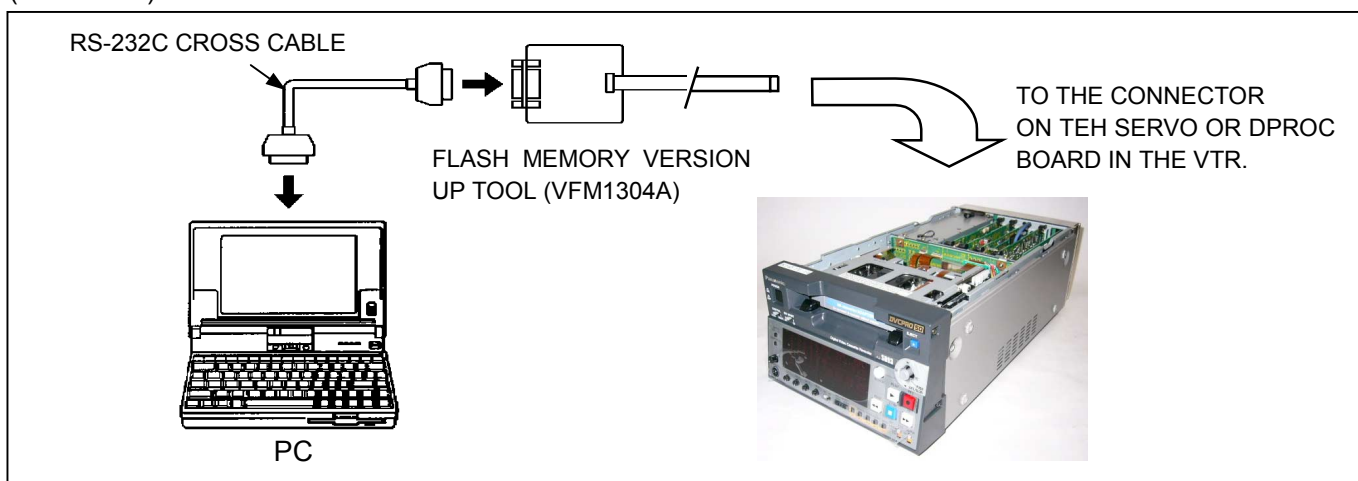


Figure 12-2A-1

12-2-1. Preparations for the Version Upgrade

1. Items required for flash memory writing

Version Upgrade Software **VFK1248N or higher**

VFK1248N consist of 4 type of software as shown below.

- VS12312N.exe
- f_servo.obf
- FW103u.exe
- Setting.ini

Personal Computer : WINDOWS95/98

RS-232C Cable (D-sub 25pin-25 pin cross cable or D-sub 9 pin-25 pin cross cable)

Flash Memory Version Up Tool **VFK1304A**

2. Switch setting of the flash memory version upgrade tool

Confirm that the switch settings for the "flash memory version up tool (VFK1304A)" are as shown below.

SW1-1: ON SW1-3: OFF
SW1-2: ON SW1-4: OFF

3. Connection

1. Connect the Flash Memory Version Up Tool (VFK1304A) with Personal Computer (MS-DOS, Windows 95® or 98®) by RS-232C cross cable as shown in figure 12-2A-1.
2. Connect the flexible cable from the Flash Memory Version Up Tool to the connector on the board to be version upgraded as shown in table 12-1 and figure 12-2A-1.
3. Turn on the VTR power and Personal Computer power.
4. Copy the Program Data software as shown table 12-1.
5. Install the version up software VFK1248N into the personal computer.

12-2-2. Microcomputer Flash ROM Version Upgrade Procedure (1)

< SYS-IF Microcomputers (DPROC Board)>

1. Turn on the VTR power.
2. Copy the program software for the SERVO and SYS_IF as shown in the table 12-1 into the personal computer.
3. Execute the VSI2312N. exe so that the following screen appears.
4. Select the CPU (Microcomputer) sheet as shown in figure 12-2B-1.

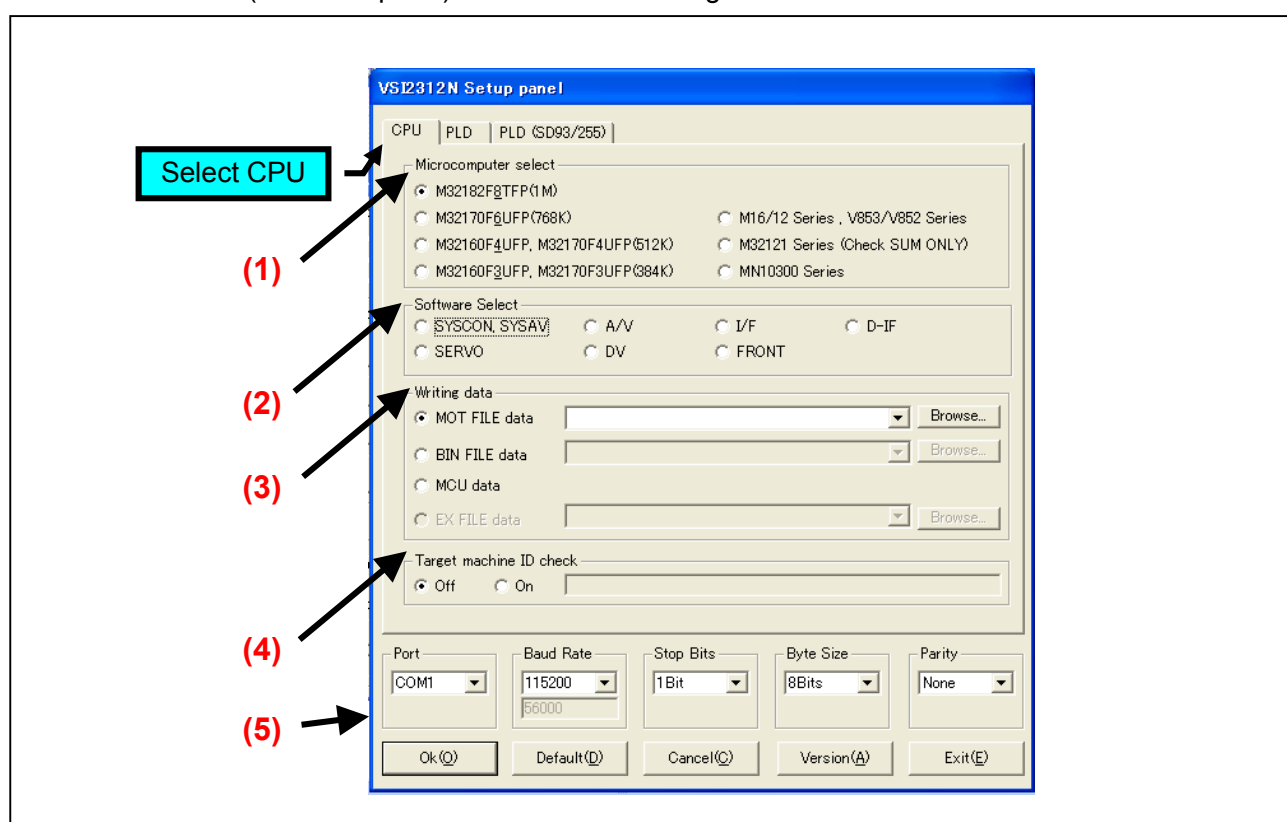


Figure 12-2B-1

5. Select the each item on the Setup Panel as shown in the table 12-2B-2.

Board Name (Slot No.)	(1) Microcomputer Select	(2) Software Select	(3) Writing data		(4) Target machine ID check
			FILE data	FILE Extension	
DPROC Board (F2)	M32182F8(1M)	Do not set any one.	MOT	.mot or s	off
(5) Setting for PC	Port	COM1	Baud Rate	115200	
	Stop Bits	1Bit	Byte size	8Bits	
	Parity				

* The numbers (1) – (5) in the above tables show the number in figure 9-1B-1 (Setup Panel).

Table 12-2B-2

6. Press **"OK"** button so that the following screen appears and check sum is calculated.
7. Press **"Start"** button so that the software programming will start.

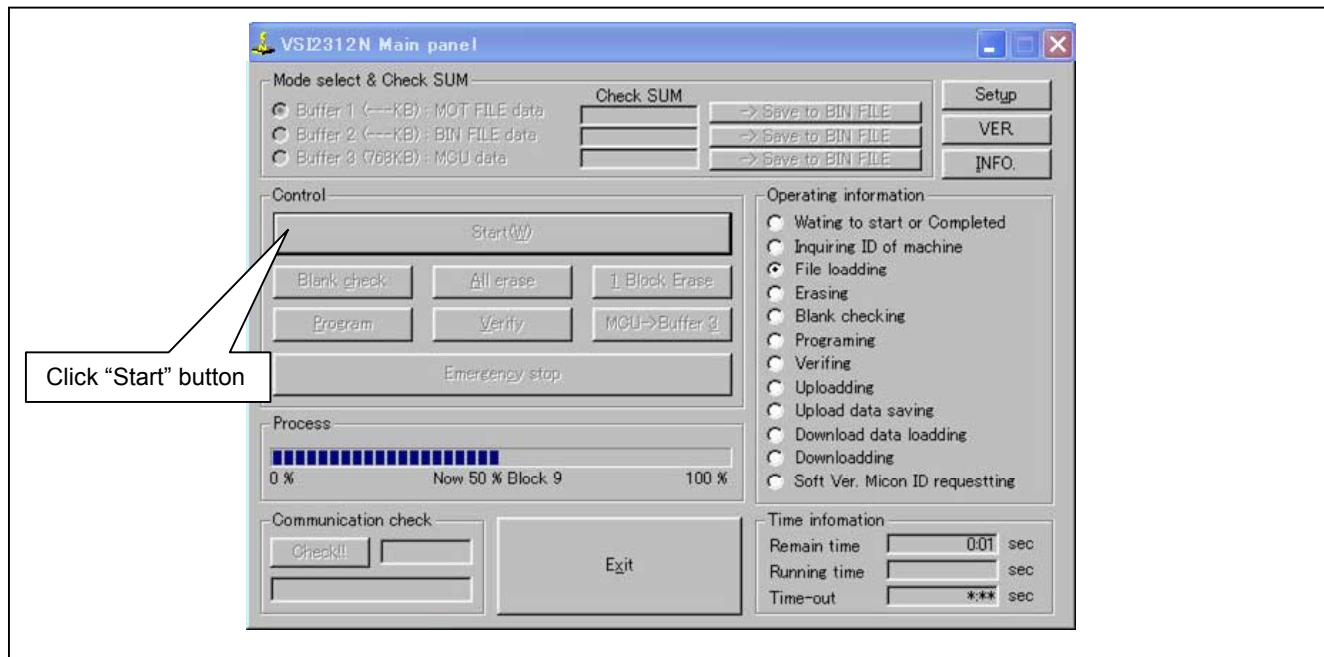


Figure 12-2B-2

8. Confirm the bar in the Process window reach to 100% that means the software programming complete as shown in figure 9-1B-3.

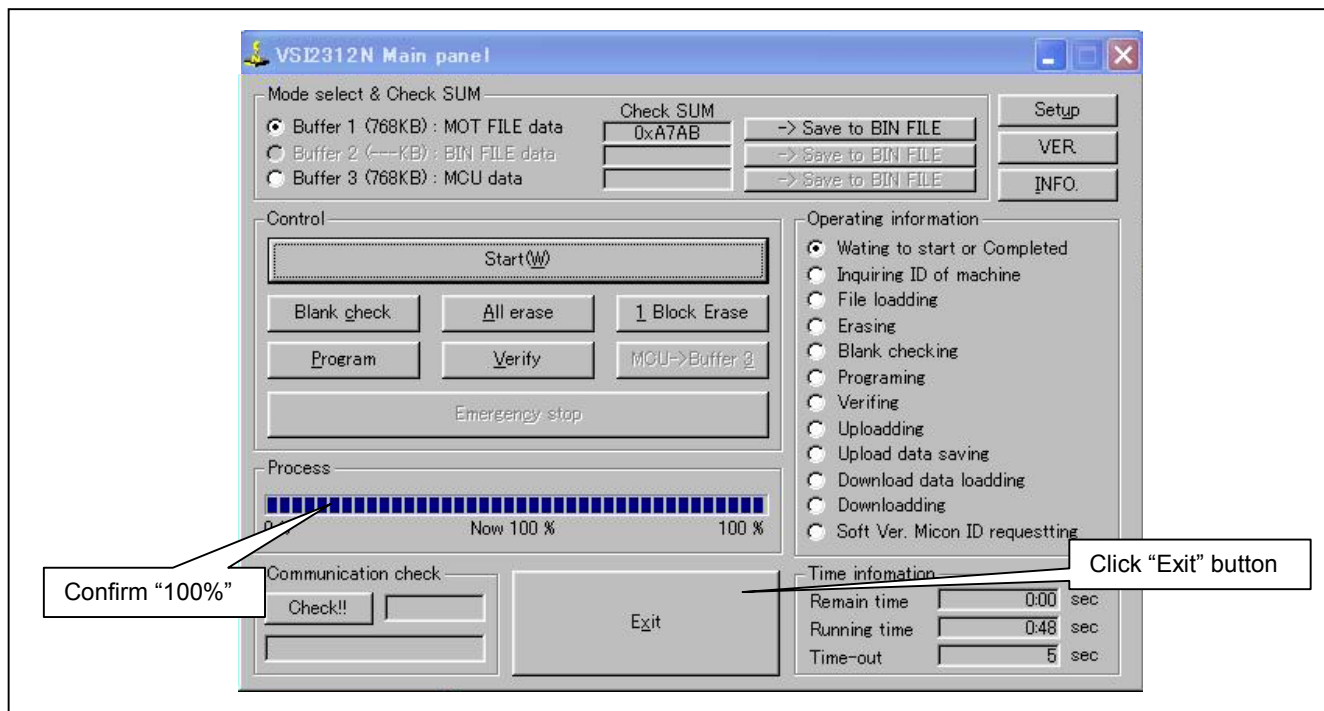


Figure 12-2B-3

9. Press **"Exit"** button to end the program.
* If the error occurs during above process, repeat the process from step 5 again.
10. Turn the power of the VTR off and then on. This will reboot the VTR.
11. Confirm that software version is updated.

12-2-3. Microcomputer Flash ROM Version Upgrade Procedure (2)

<SERVO Microcomputers (SERVO Board)>

1. Turn on the VTR power.
2. Copy the program software for the SERVO and SYS_IF as shown in the table 12-1 into the personal computer.
3. Execute the VSI2312N. exe so that the following screen appears.
4. Select the CPU (Microcomputer) sheet as shown in figure 9-1C-1.

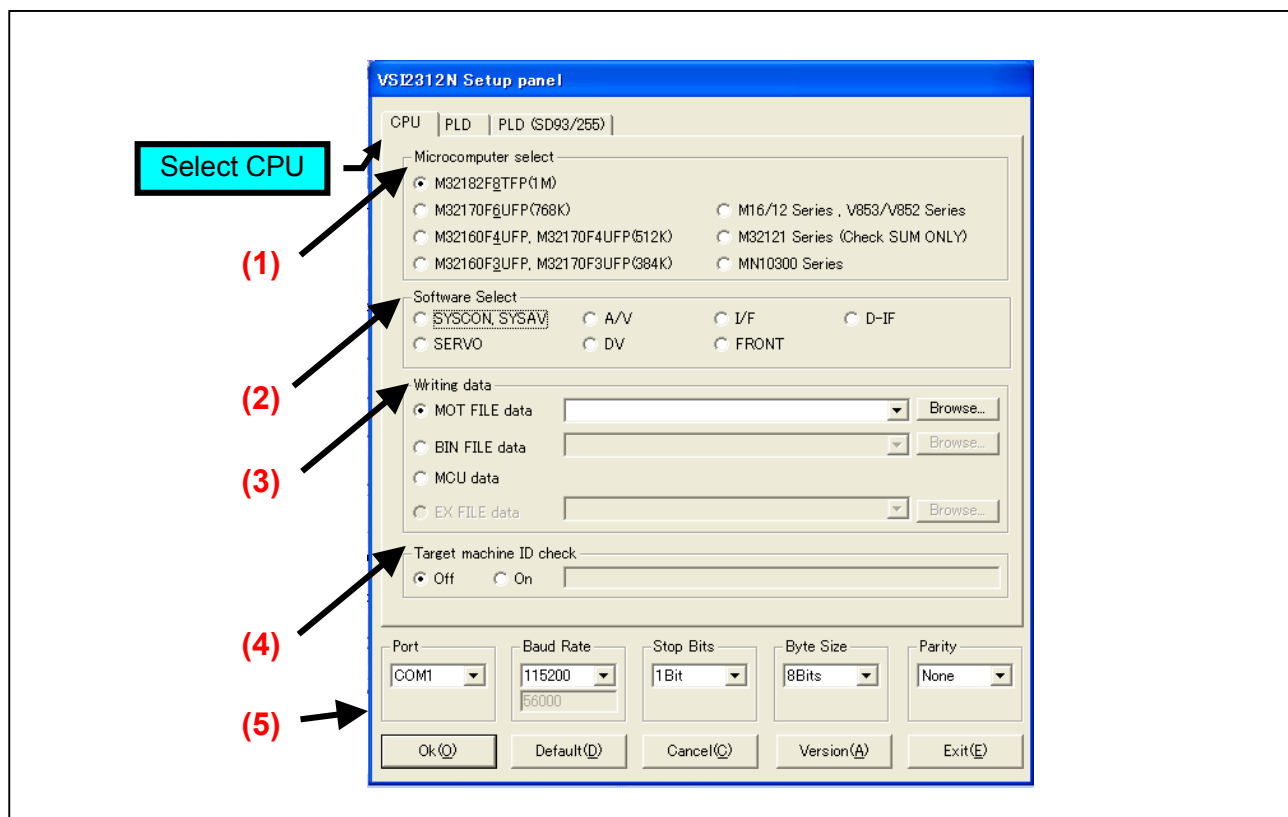


Figure 12-2C-1

5. Select the each item on the Setup Panel as shown in the table 9-1-10.

Board Name (Slot No.)	(3) Microcomputer Select	(4) Software Select	(3) Writing data		(4) Target machine ID check
			FILE data	FILE Extension	
SERVO Board (F1)	MN10300 Series	Do not set any one.	MOT	.mot or s	off
(5) Setting for PC	Port	COM1	Baud Rate	115200	
	Stop Bits	1Bit	Byte size	8Bits	
	Parity				

* The numbers (1) – (5) in the above tables show the number in figure 9-1B-1 (Setup Panel).

Table 12-2C-2

6. Press **“OK”** button so that the following screen appears.
 Note: The check sum is not calculated for the SERVO microcomputer.

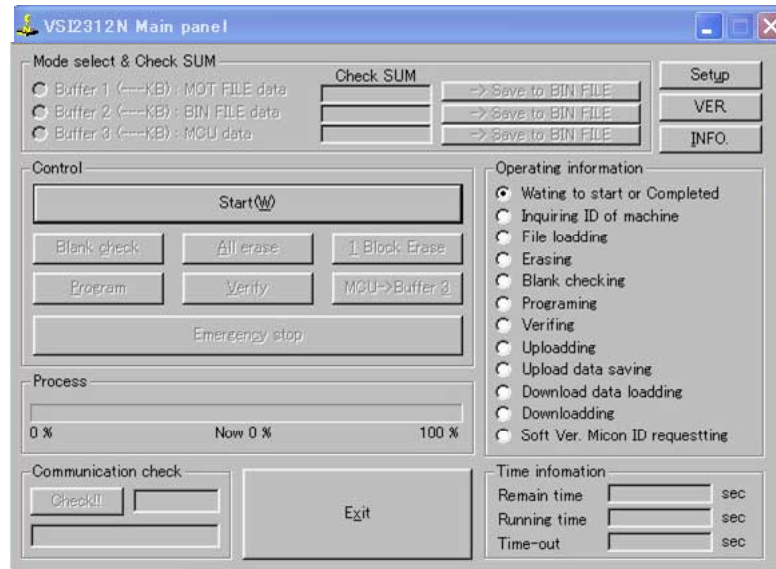


Figure 12-2C-3

7. Click **“Start”** button as shown in figure 9-1C-3 so that the following comment appears in the MS DOS screen.
Do you continue? Y/N>

```
Could not record flash memory exchange record.
Do you continue ? Y/N >
```

Figure 12-2C-4

8. Select **“Y”** and press **“Enter”**, then the program will start.

```
FW103U.EXE V0.05 R03/UNKNOWN (UART) 2000-1/12(Wed) 00:18:00
Copyright 1997-2000 Matsushita Electric Industrial Co.,Ltd.
fw103> ENV WNL CNT, 41
fw103> ENV PPL CNT, 12
fw103> ENV BEL CNT, 42
fw103> ENV NCER EV, 906
fw103> ENV SPEED, 16
fw103> ENV DEVICE, 1
fw103> ENV CKCTR, 1
fw103> ENV ZRETRY, 200
fw103> ENV ERETRY, 2000
fw103> ENV WRETRY, 200
fw103> ENV PRETRY, 200
fw103> INIT
fw103> load VSI3887.EX
Ex format file analysis ...
start loading

Zero writing before erase
Erase block .....
0x00002000 - 0x00003fff writing
0x00004000 - 0x00005fff writing
0x00006000 - 0x00007fff writing
0x00008000 - 0x00009fff writing
0x0000a000 - 0x0000bfff writing
```

Figure 12-2C-5

9. The screen display of MS-DOS changes to Windows screen after the programming complete.
10. Press **“Exit”** button to end the program.
11. Turn the power of the VTR off and then on. This will reboot the VTR.
12. Confirm that software is updated.

12-2-4. PLD (FPG) Version Upgrade Procedure

1. Turn on the VTR power.
2. Copy the program software for the AVMON, AVPROC, DVPROC, D-IF, AVIO and SDI as shown in the table 12-1 into the personal computer.
3. Execute the VSI2312N. exe so that the following screen appears.
4. Select the PLD (SD93/255) sheet as shown in figure 12-2D-1.

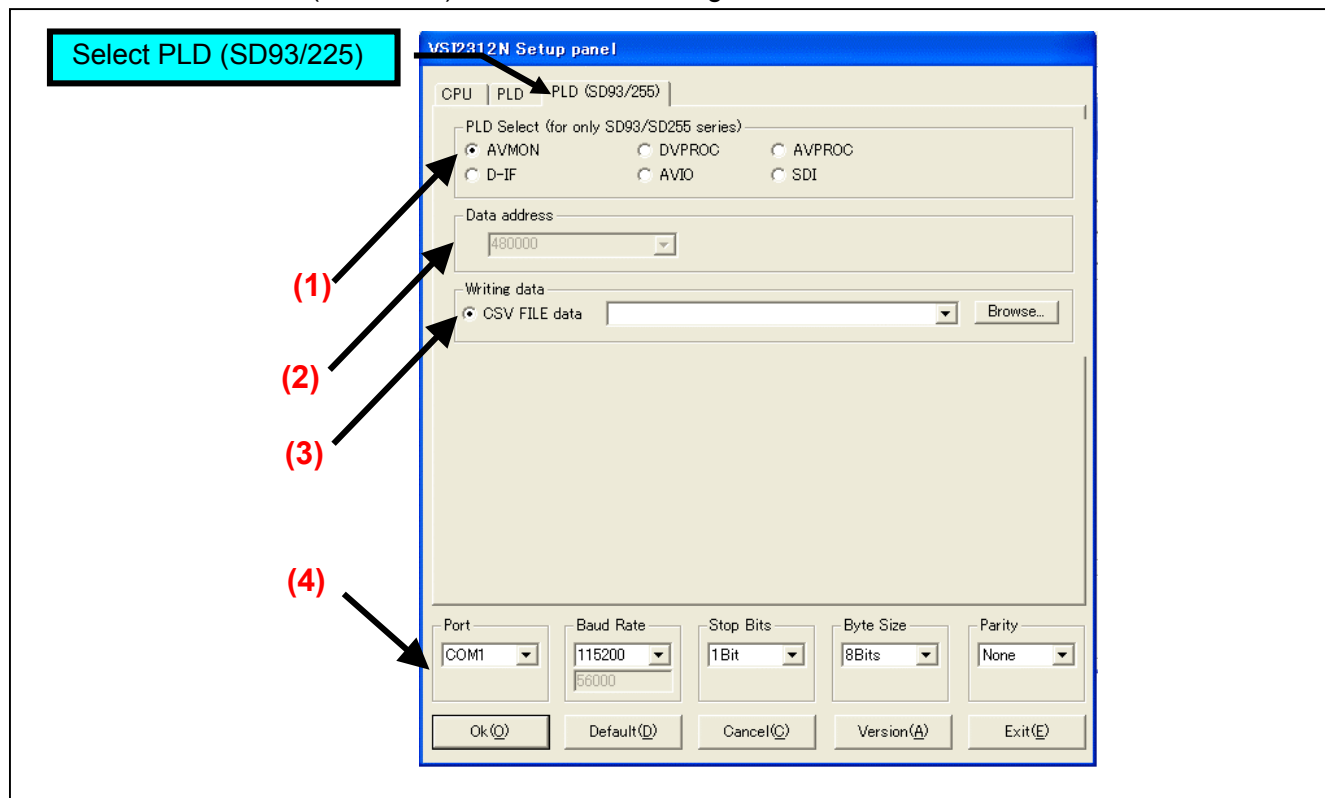


Figure 12-2D-1

5. Select the each item on the Setup Panel as shown table 9-1D-2.

Board Name (Slot No.)	Name of PLD (Ref. No.)		(1) Software Select	(3) Writing data
AVMON Board (F2)	AVMON FPG [IC3200]		AVMON	tff
DPROC Board (F3)	AVPROC FPG [IC1201, 901]		AVPROC	
	DVPROC FPG [IC1501]		DVPROC	
	D-I/F FPG [IC10501]		D-I/F	
AVIO Board (F4)	AVIO FPG [IC3400]		AVIO	
SDI Board (F5)	SDI FPG [IC255]		SDI	
(4) Setting for PC	Port	COM1	Baud Rate	115200
	Stop Bits	1Bit	Byte size	8Bits
	Parity	None		

* The numbers (1) – (4) in the above tables show the number in figure 9-1D-1 (Setup Panel).

Table 12-2D-2

6. Click “OK” button so that the following screen appears and check sum is calculated.
7. Click “Start” button so that the software programming will start.
8. Confirm the bar in the Process window reach to 100% that means the software programming complete as shown in figure 9-1D-4.

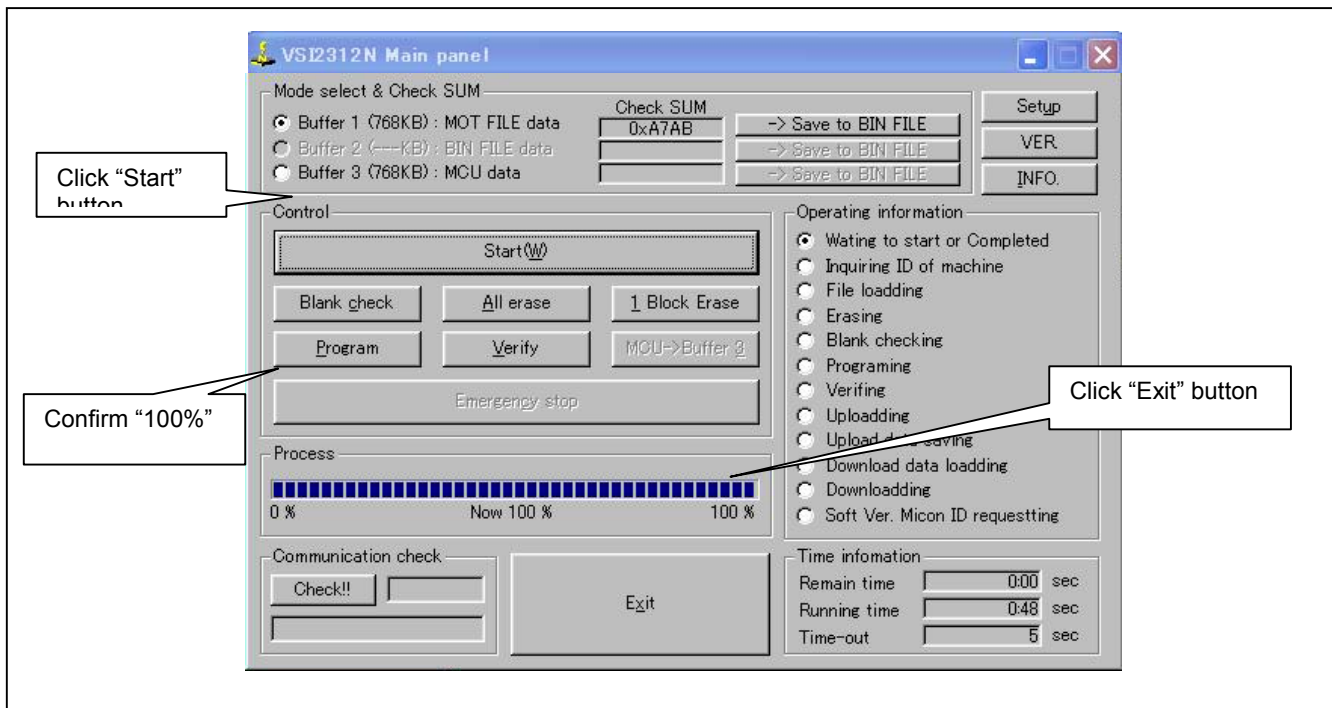


Figure 12-2D-3

9. Click **“Exit”** button to end the program.
 * If the error occurs during above process, repeat the process from step 7 again.
10. Turn off and on the power of VTR in order to reboot the machine.
11. Confirm that the software version is updated.
12. Turn off the VTR power and remove the Flash memory version up tool and cables.

12-2-5. PLD Version Upgrade Procedure [SERVO IC]

This Model uses PLD on the SERVO Board. At the time of a version upgrade, use the special tool, connect to PLD Connector on the SERVO Board, and use the PLD writing software as shown table 12-1A-1.

1. Preparation

ITEM	REMARK
CPLD WRITER	VFK1590, VFK1590P2 (VFK1590 standard)
D-sub 25pin-25pin Cable	Straight (Male - Female), Length : Within 1meter
Version Upgrade Software	MAX+plus II Software ver9.6 or over ver9.6 Access to www.altera.com/support/software/download/sof-download_center.html and select " ASAP 2 " in programming software portion in order to download it.
File NAME	jcf File (Included in "VSI4319A" file). (Copy all files of the VSI4319A which is included " *.jct " file to floppy disk)
Personal Computer	WINDOWS 95® or 98®

Table 12-2E-1

2. Connection

1. Connect the D-sub Cable between CN201(for ALTERA) connector of the CPLD WRITER (VFK1590) and Personal Computer (Printer port).
2. Connect the CPLD WRITER Cable (VFK1590P2) between P201(for ALTERA) connector and P250 connector on the SERVO Bord in the VTR as shown in figure 12-2E-2 and table 12-2E-3.
3. Turn on the VTR and Personal Computer (Windows mode).

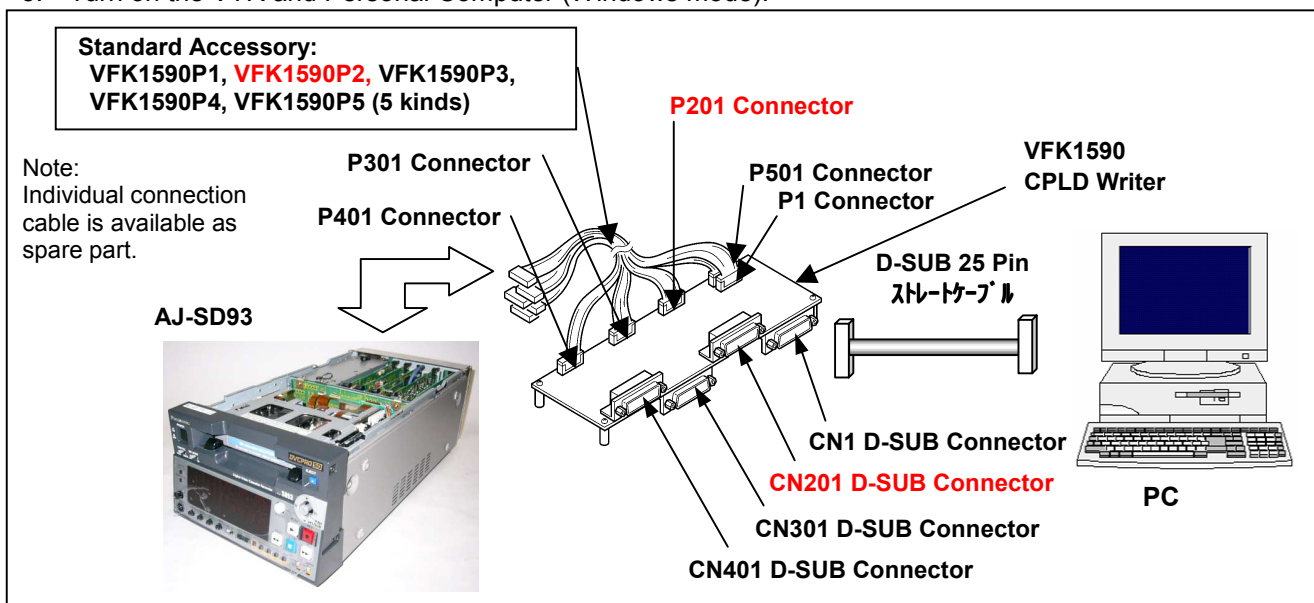


Figure 12-2E-2

IC Manufacture	Connection Between CPLD Writer/PC		Connection Between CPLD Writer/SERVO Board		
	Cable	Connector Ref. No.	Cable Part No.	CPLD Ref. No.	Connector on SERVO Board
ALTERA	D-SUB 25Pin Cable (Straight)	CN201	VFK1590P2	P201	P250

Table 12-2E-3

3. Boot up the Ver. up Software and Ver. up Procedure

1. Insert floppy disk (which is included all files of the VSI4319A) to floppy drive.
2. Select "**start button**" on the Windows Screen and then "**Program**" and then boot up the "**MAX+plus II *** programmer only**" so that the following menu appears.

3. On main window, select tab **"MAX+plus II"** and then **"Programmer"**.
4. On main window (Programmer window is displayed), select tab **"Option"** and then **"Hardware Setup"**.
5. On **Hardware Setup** dialog, set the **"Hardware Type"** to **"Byte Blaster (MV)"**.

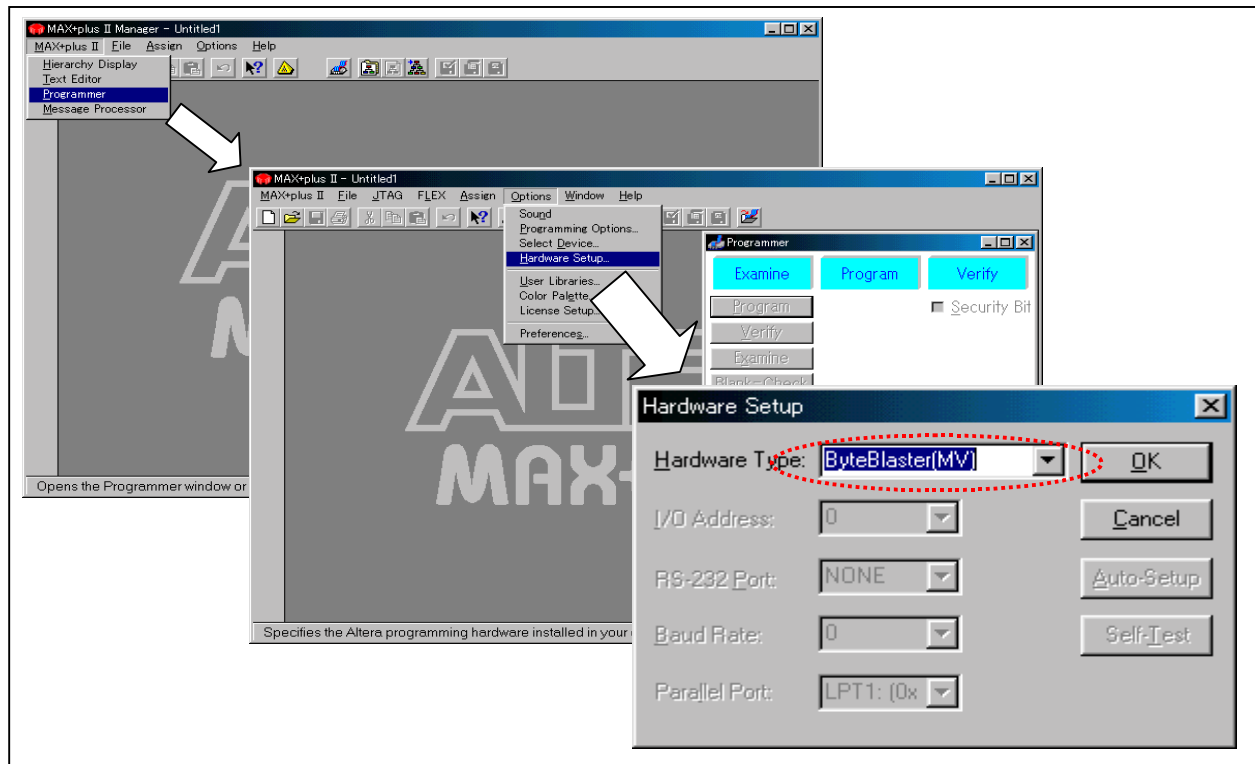


Figure 12-2E-4

6. On main window, select tab **"JTAG"**, and then select **"Restore JCF..."**.
7. Select the floppy drive and then, select the **"jcf format file (*.jcf)"** on dialog box of **Restore JCF** and then press **"OK"** button.

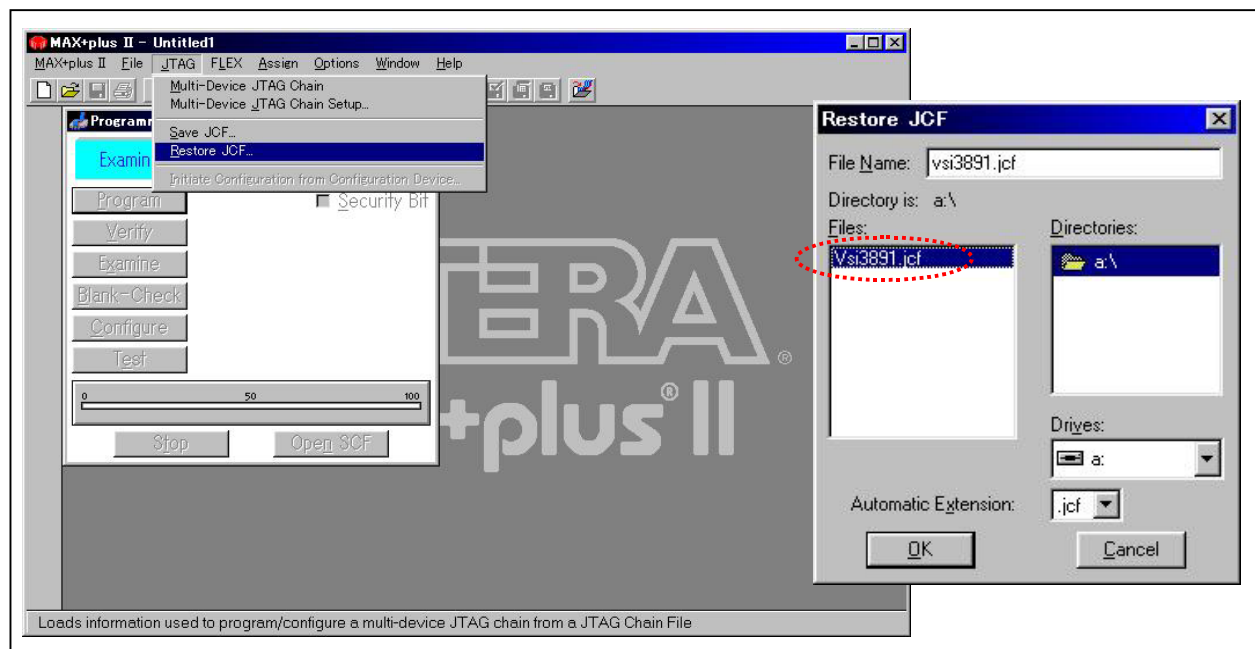


Figure 12-2E-5

8. If the following message appeared, Press **“Yes”** button.

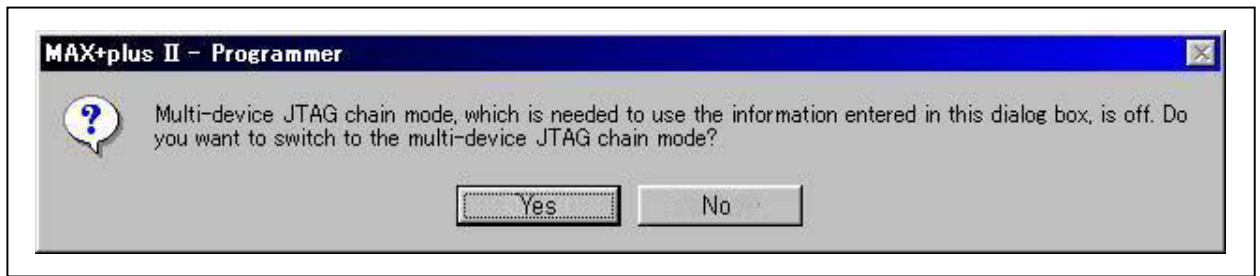


Figure 12-2E-6

9. Click the **“Program”** button on Programmer dialog.
10. When Progress Bar reaches at point of **100**, the message “Programming Complete” appears, then PLD version upgrade is completed. Click **“OK”** button on the **Programming complete** message Dialog.
11. Confirm that PLD version of VTR is updated. (Refer to page INF-12)

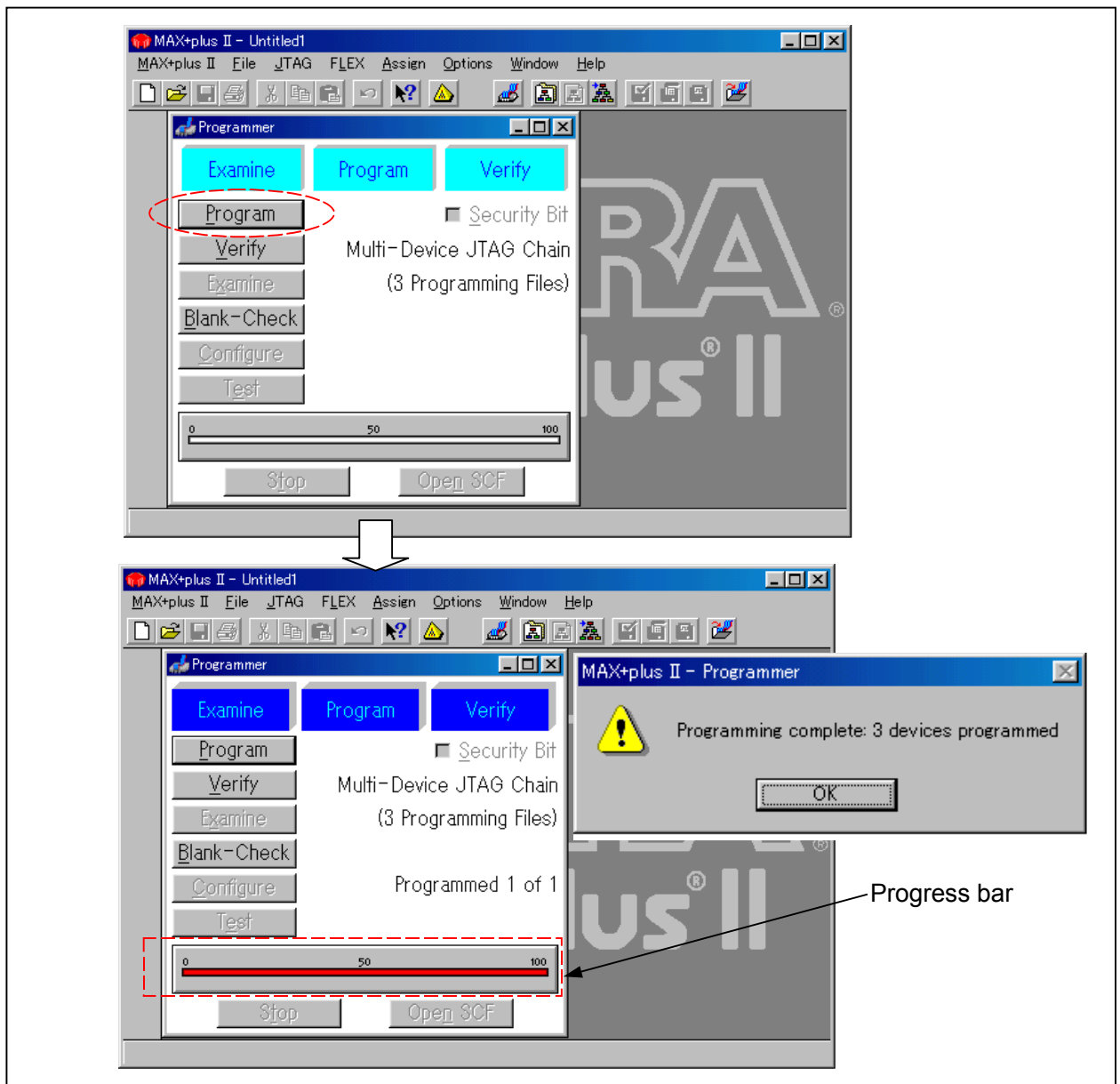


Figure 12-2E-7

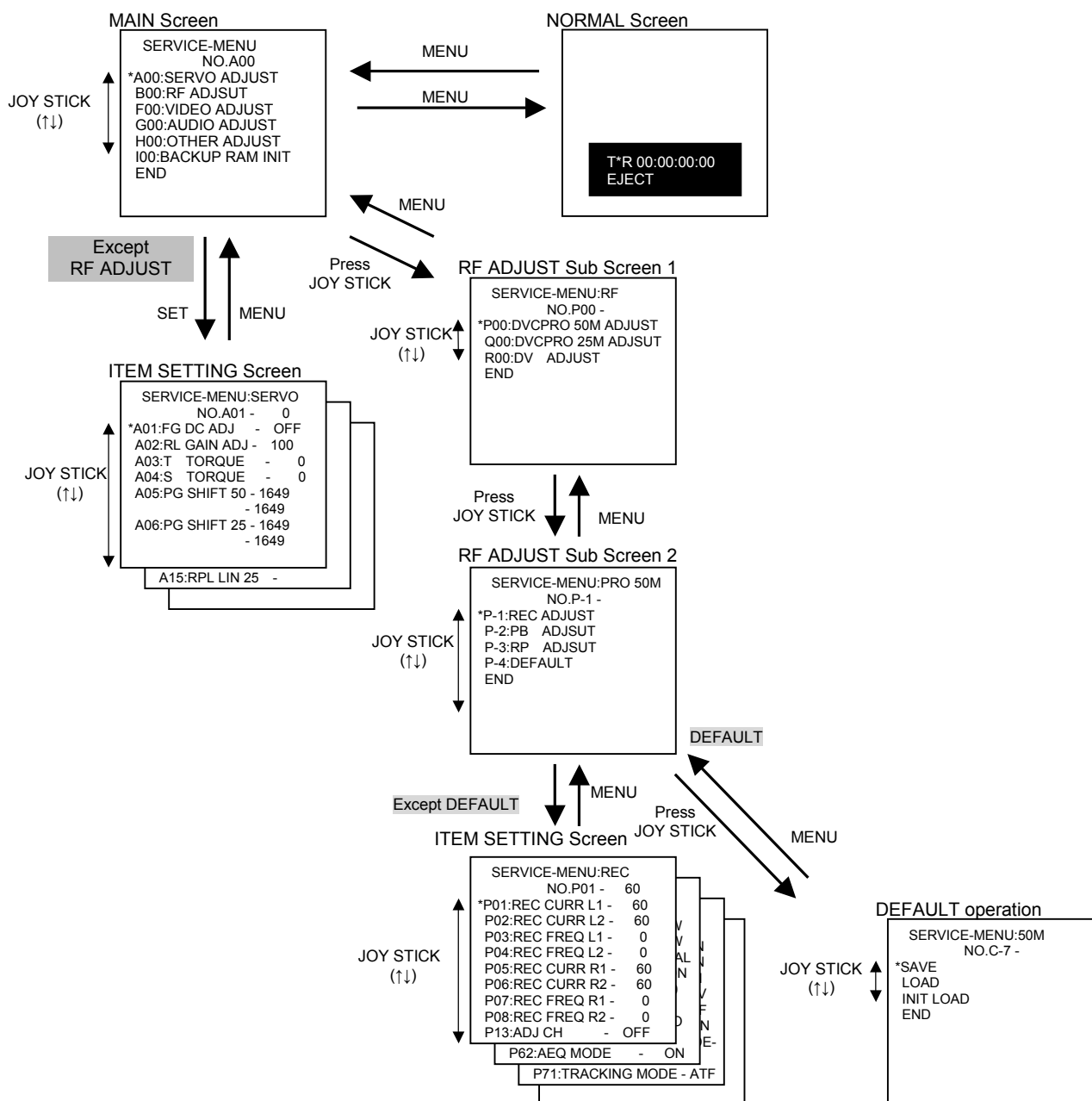
* MAX+PLUS are registered trademarks of Altera Corporation.

* Windows95 and Windows98 are registered trademarks of Microsoft Corporation. SDI

13. SERVICE MENU

13-1. Service Menu Operation Method

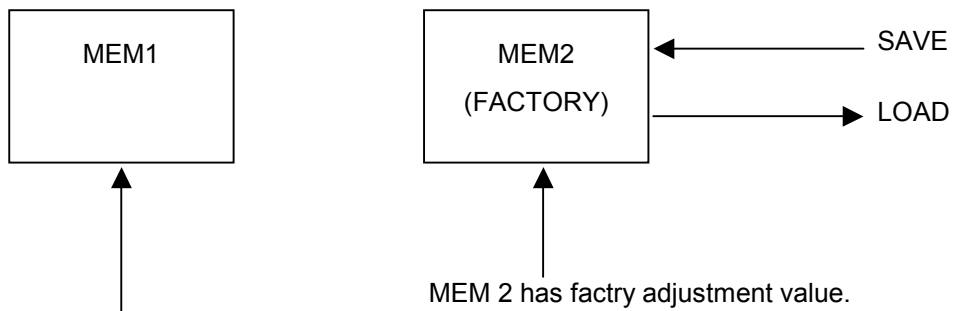
1. Confirm that the “REMOTE/LOCAL” switch on the front panel is set to the “LOCAL”.
2. Press the “MENU” button on the front panel to display the “SETUP-MENU”.
3. When the “SETUP-MENU” is displayed, press the “MENU” button while pressing the “EJECT” button and the “STOP” button. Then, the “SERVICE-MENU” is displayed.
4. Move the cursor “ * ” with the JOY STICK (↑↓) to select any main item among items from A00 to I00. PUSH the set button to move into Sub Screen.
5. If any of main items (**A00**, **F00**, **G00**, **H00**, **I00**) other than the RF adjustment (**B00**), the V IN adjustment (**C00**) and the V OUT adjustment (**D00**) is selected, the **item setting screen** of the selected main item is displayed by pressing the “SET” button on the front panel.
6. For the RF adjustment (**B00**), the V IN adjustment (**C00**) and the V OUT adjustment (**D00**), select the item on the **Sub Screen**, and then, press the “SET” button. Then, the item setting screen of the selected item is displayed.
7. Settings can be altered by rotating the Search Dial while Search button is pushed.
8. Press Menu button to end the Service mode.



13-2. DEFAULT Operation

* RF adjustment (B00)

The VTR have two memory area for the adjustment value as indicated below.



MEM 1 is always renewed in accordance with the adjustment value on the RF and EQ adjustment menu.

* Operating procedures

1. Move the cursor “*” onto the “P-4/Q-4/R-5 : DEFAULT”.
2. press the “SET” button on the front panel.
3. Select the objective item by rotating Search Dial “*” onto the objective item.

SAVE : The present setting is saved to MEM 2 as the factory adjustment.

LOAD : The saved backup value can be loaded to MEM 1 as the current setting.

INIT LOAD : The default value is loaded to MEM 1.
The default value is different from the factory adjustment value.

4. Press the “SET” button on the front panel. Then, the selected operation is carried out, and then, the item setting screen is displayed again.

13-3. Service Menu Contents

A00: SERVO ADJUST

Item		Set value		Setting contents and outline function explanation	BACK -UP	Remarks
No.	SUPER DISP.	No.	SUPER DISP.			
A02	RL GAIN ADJ	T REEL		Automatic adjustment of the reel torque of the S/T-Reel.	Yes	
		0	0			
		<u>100</u>	<u>100</u>			
		255	255			
S REEL						
0	0					
<u>100</u>	<u>100</u>					
255	255					
A03	T TORQUE	-128 <u>0</u> 127	-128 <u>0</u> 127	Compensation of the T-reel driver offset value	Yes	
A04	S TORQUE	-128 <u>0</u> 127	-128 <u>0</u> 127	Compensation of the S-reel driver offset value	Yes	
A05	PG SHIFT 50	RISE		Alignment tape is used for PG mono-multi automatic adjustment.	Yes	
		0	0			
		<u>1649</u>	<u>1649</u>			
		4095	4095			
FALL						
0	0					
<u>1649</u>	<u>1649</u>					
4095	4095					
A06	PG SHIFT 25	RISE		Alignment tape is used for PG mono-multi automatic adjustment.	Yes	
		0	0			
		<u>1649</u>	<u>1649</u>			
		4095	4095			
FALL						
0	0					
<u>1649</u>	<u>1649</u>					
4095	4095					
A07	T PHOTO		Voltage value 0.0V 3.3V	Indication of the detection voltage of the photo sensor for beginning and end detection on the T-side This is used for adjustment of the sensitivity of the photo sensor.	No	
A08	S PHOTO		Voltage value 0.0V 3.3V	Indication of the detection voltage of the photo sensor for beginning and end detection on the S-side This is used for adjustment of the sensitivity of the photo sensor.	No	
A09	TENSION	<u>0</u> 1	Non- display ON	Loading operation for tension offset adjustment	No	
A10	X VALUE 50	-128 <u>0</u> 127	-128 <u>0</u> 127	Electrical fine adjustment of the X-value	Yes	

Item		Set value		Setting contents and outline function explanation	BACK -UP	Remarks
No.	SUPER DISP.	No.	SUPER DISP.			
A11	X VALUE 25	-128 0 127	-128 0 127	Electrical fine adjustment of the X-value	Yes	
A12	RPL GAIN 50	-128 0 127	-128 0 127	LISTA sensitivity adjustment for RPL1/RPL2 head	Yes	
A13	RPL LIN 50	0 1	Non- display ON	Adjustment of the Lista linearity for RPL1/RPL2 head	No	
A14	RPL GAIN 25	-128 0 127	-128 0 127	LISTA sensitivity adjustment for RPL1/RPL2 head	Yes	
A15	RPL LIN 25	0 1	Non- display ON	Adjustment of the Lista linearity for RPL1/RPL2 head	No	
A16	PBL GAIN 50	-128 0 127	-128 0 127	LISTA sensitivity adjustment for PBL1/PBL2 head	Yes	
A17	PBL GAIN 25	-128 0 127	-128 0 127	LISTA sensitivity adjustment for PBL1/PBL2 head	Yes	
A18	RPR GAIN DV	-128 -60 127	-128 -60 127	LISTA sensitivity adjustment for RPR1/RPR2 head	Yes	
A19	TRK VAL 50RP	-128 0 127	-128 0 127	The CTL tracking offset value can be changed for RP head for 50M.	No	
A20	TRK VAL 50PB	-128 0 127	-128 0 127	The CTL tracking offset value can be changed for PB head for 50M.	No	
A21	TRK VAL 25RP	-128 0 127	-128 0 127	The CTL tracking offset value can be changed for RP head for 25M.	No	
A22	TRK VAL 25PB	-128 0 127	-128 0 127	The CTL tracking offset value can be changed for PB head for 25M.	No	

B00: RF ADJUST

RF ADJUST sub-screen

Item		Item contents
No.	SUPER DISP.	
P00	DVCPRO 50M ADJUST	Adjustment for DVCPRO50 (50 Mbps)
Q00	DVCPRO 25M ADJUST	Adjustment for DVCPRO (25 Mbps)
R00	DV ADJUST	Adjustment for DV

DVCRRO 50M ADJUST sub-screen

Item		Item contents
No.	SUPER DISP.	
P-1	REC ADJUST	Adjustment of the recording system for DVCPRO50 (50 Mbps)
P-2	PB ADJUST	Adjustment of the playback system (PB head) for DVCPRO50 (50 Mbps)
P-3	RP ADJUST	Adjustment of the playback system (RP head) for DVCPRO50 (50 Mbps)
P-4	DEFAULT	<p>LOAD/SAVE of the factory default adjustment values/initial values LOAD operation</p> <ul style="list-style-type: none"> Perform operation in regard to the adjustment values for DVCPRO50 (50 Mbps). <p>Operation:</p> <ol style="list-style-type: none"> Move the cursor to P-4: DEFAULT and press "JOY STICK". Turn (↑) the "JOY STICK" and move the cursor to the desired operation item. <ul style="list-style-type: none"> SAVE ... Save the present set values as the factory default values. LOAD ... Load the saved factory default values as the present set values. (When SAVE operation has not been performed, the initial values will be loaded.) INIT LOAD ... Load the initial value (which designer decide) as the present set values. When the "JOY STICK" is pressed, the selected operation will be performed and it will return to the item setting screen. When the "MENU" button is pressed, no operation will be performed and it will return the item setting screen.

DVCRRO 25M ADJUST sub-screen

Item		Item contents
No.	SUPER DISP.	
Q-1	REC ADJUST	Adjustment of the recording system for DVCPRO (25 Mbps)
Q-2	PB ADJUST	Adjustment of the playback system (PB head) for DVCPRO (25 Mbps)
Q-3	RP ADJUST	Adjustment of the playback system (RP head) for DVCPRO (25 Mbps)
Q-4	DEFAULT	<p>LOAD/SAVE of the factory default adjustment values/initial values LOAD operation</p> <ul style="list-style-type: none"> Perform operation in regard to the adjustment values for DVCPRO (25 Mbps). <p>Operation:</p> <ol style="list-style-type: none"> Move the cursor to Q-4: DEFAULT and press "JOY STICK". Turn (↑) the "JOY STICK" and move the cursor to the desired operation item. <ul style="list-style-type: none"> SAVE ... Save the present set values as the factory default values. LOAD ... Load the saved factory default values as the present set values. (When SAVE operation has not been performed, the initial values will be loaded.) INIT LOAD ... Load the initial value (which designer decide) as the present set values. When the "JOY STICK" is pressed, the selected operation will be performed and it will return to the item setting screen. When the "MENU" button is pressed, no operation will be performed and it will return the item setting screen.

DV ADJUST sub-screen

Item		Item contents
No.	SUPER DISP.	
R-3	RP ADJUST	Adjustment of the playback system (RP head) for DV
R-4	DEFAULT	<p>LOAD/SAVE of the factory default adjustment values/initial values LOAD operation</p> <ul style="list-style-type: none"> Perform operation in regard to the adjustment values for DV. <p>Operation:</p> <ol style="list-style-type: none"> Move the cursor to R-4: DEFAULT and press "JOY STICK". Turn (↑) the "JOY STICK" and move the cursor to the desired operation item. <ul style="list-style-type: none"> SAVE ... Save the present set values as the factory default values. LOAD ... Load the saved factory default values as the present set values. (When SAVE operation has not been performed, the initial values will be loaded.) [INIT LOAD ... Load the initial value (which designer decide) as the present set values.] When the "JOY STICK" is pressed, the selected operation will be performed and it will return to the item setting screen. When the "MENU" button is pressed, no operation will be performed and it will return the item setting screen.

REC ADJUST (DVCPRO 50M ADJUST, DVCPRO 25M ADJUST subscreen)

Item		Set value		Setting contents and outline function explanation	BACK-UP	Remarks
No.	SUPER DISP.	No.	SUPER DISP.			
P01 Q01	REC CURR L1	P01 -128 -128 60 60 127 127 Q01 -128 -128 60 60 127 127		Adjustment of the RP L1 head recording current	Yes	Use for electrical adjustment
P02 Q02	REC CURR L2	P02 -128 -128 60 60 127 127 Q02 -128 -128 60 60 127 127		Adjustment of the RP L2 head recording frequency characteristic	Yes	Use for electrical adjustment
P05 Q05	REC CURR R1	P05 -128 -128 60 60 127 127 Q05 -128 -128 60 60 127 127		Adjustment of the RP R1 head recording current	Yes	Use for electrical adjustment
P06 Q06	REC CURR R2	P06 -128 -128 60 60 127 127 Q06 -128 -128 60 60 127 127		Adjustment of the RP R2 head recording f characteristic	Yes	Use for electrical adjustment
P13 Q13	ADJ CH	0 1 2 3 4	OFF PBL PBR RPL RPR	Channel(Head) selection for recording adjustment • The setting is held until exit from 50M ADJUST, 25M ADJUST.	No	Factory use only
P16 Q16	REC DATA	0 1	NORMAL CW	Recording data selection	No	Factory use only
P17 Q17	XCAN MODE	0 1	OFF ON	Crosstalk canceler ON/OFF setting • The setting is held until exit from 50M ADJUST, 25M ADJUST.	No	Factory use only
P60 Q60	VITERBI MODE	0 1 2 3	OFF PR4 EPR4 AUTO	Setting whether Viterbi decoding is to be used for detection of playback data or not • The setting is held until exit from 50M ADJUST, 25M ADJUST.	No	Use for electrical adjustment

Item		Set value		Setting contents and outline function explanation	BACK-UP	Remarks
No.	SUPER DISP.	No.	SUPER DISP.			
P61 Q61	EQ STB	0 —1	OFF <u>ON</u>	ON/OFF setting for the automatic standby detection function Automatic standby detection function: When the playback envelope is not detected for several seconds, the mode automatically shifts to standby mode (the mode where playback processing is stopped and the VCO center frequency is adjusted automatically). • The setting is held until exit from 50M ADJUST, 25M ADJUST.	No	Factory use only
P62 Q62	AEQ MODE	0 —1	OFF <u>ON</u>	Setting of the Adaptive EQ function of the adaptive equalization filter • The setting is held until exit from 50M ADJUST, 25M ADJUST.	No	Use for electrical adjustment
P63 Q63	AEQ HOLD	0 —1	OFF <u>ON</u>	ON/OFF setting for the function for temporary holding of adaptive equalization control during the transitional period when the relative speed changes. • The setting is held until exit from 50M ADJUST, 25M ADJUST.	No	Factory use only
P64 Q64	FLT MODE	0 —1	OFF <u>ON</u>	ON/OFF setting for the fault detection function Fault detection function: When the adaptive filter or the PLL drops into a divergent state at the time of mode switching like search etc., and a status is detected where no normal signal can be detected over a period of 5 tracks or more, this function pulls the status of the adaptive filter or the PLL to the initial status. • The setting is held until exit from 50M ADJUST, 25M ADJUST.	No	Factory use only
P65 Q65	PLL MONI	0 —1	OFF <u>ON</u>	ON/OFF setting for PLL frequency monitor control Frequency monitor control: When a status is detected where the playback clock frequency at the time of mode switching during playback is outside the permissible range set by MONI LIM PB1 for the specified time or longer, this function automatically pulls the frequency back to the reference frequency corresponding to the relative speed. • The setting is held until exit from 50M ADJUST, 25M ADJUST.	No	Factory use only
P66 Q66	MONI KINDSEL	—1 2 3	ENV EYEE EYEO	Selection of monitor signal • The setting is held until exit from 50M ADJUST, 25M ADJUST.	No	Use for electrical adjustment
P67 Q67	MONI CHSEL	—0 1 2 3 4	OFF PBL PBR RPL RPR	Selection of monitor channel(Head) • The setting is held until exit from 50M ADJUST, 25M ADJUST.	No	Use for electrical adjustment
P68 Q68	ECC MODE	—0 1 2	ALL ON OT OFF AL OFF	Setting of error correction control 0: Error correction for INNER and OUTER. 1: Error correction only for INNER, but not for OUTER. 2: No error correction for INNER and OUTER. • The setting is held until exit from 50M ADJUST, 25M ADJUST.	No	
P69 Q69	CONCEAL MOD	—0 1	ON OFF	Setting of error revision control 0: Error revision is performed. 1: Error revision is not performed. • The setting is held until exit from 50M ADJUST, 25M ADJUST.	No	
P70 Q70	ERROR MODE	—0 1	FAST SLOW	Setting of the error sampling time 0: FAST mode 1: SLOW mode • The setting is held until exit from 50M ADJUST, 25M ADJUST.	No	
P71 Q71	TRACKING MOD	—0 1	ATF CTL	Tracking mode setting 0: ATF tracking 1: CTL tracking • The setting is held until exit from 50M ADJUST, 25M ADJUST.	No	
P72 Q72	TRACKING VAL	-128 —0 127	-128 —0 127	Offset value setting for CTL tracking • Effective only at the time of TRACKING MOD = CTL. • The setting is held until exit from 50M ADJUST, 25M ADJUST.	No	
P73 Q73	ATF HEAD	—0 1	PB RP	Head selection for ATF tracking 0: PB head 1: RP head	No	

PB ADJUST (DVCPRO 50M ADJUST, DVCPRO 25M ADJUST sub-screen)

Item		Set value		Setting contents and outline function explanation	BACK -UP	Remarks
No.	SUPER DISP.	No.	SUPER DISP.			
P01 Q01	PHS L1	-128 -20 127	-128 -20 127	Adjustment of the L1 head playback phase	Yes	Use for electrical adjustment
P02 Q02	PHS L2	-128 -20 127	-128 -20 127	Adjustment of the L2 head playback phase	Yes	Use for electrical adjustment
P03 Q03	MAG L1	-128 20 127	-128 20 127	Adjustment of the L1 head playback amplitude	Yes	Use for electrical adjustment
P04 Q04	MAG L2	-128 20 127	-128 20 127	Adjustment of the L2 head playback amplitude	Yes	Use for electrical adjustment
P05 Q05	PHS R1	-128 -20 127	-128 -20 127	Adjustment of the R1 head playback phase	Yes	Use for electrical adjustment
P06 Q06	PHS R2	-128 -20 127	-128 -20 127	Adjustment of the R2 head playback phase	Yes	Use for electrical adjustment
P07 Q07	MAG R1	-128 20 127	-128 20 127	Adjustment of the R1 head playback amplitude	Yes	Use for electrical adjustment
P08 Q08	MAG R2	-128 20 127	-128 20 127	Adjustment of the R2 head playback amplitude	Yes	Use for electrical adjustment
P09 Q09	ENV L1	0 255	0 255	Playback signal envelope level read-out value averaged for each track of each head ENV L1: L1 head ENV L2: L2 head Averaging is performed at 8 points in the track, and the newest track value for which averaging has been completed at the time when read-out is started will be read out. • Read-out is possible only at the time of PLAY and REC.	Yes	Factory use only
P10 Q10	ENV L2	0 255	0 255		Yes	Factory use only
P11 Q11	ENV R1	0 255	0 255		Yes	Factory use only
P12 Q12	ENV R2	0 255	0 255		Yes	Factory use only
P13 Q13	AGC SPD	0 3	0 3	Setting of the AGC response speed	Yes	Factory use only Do not change any setting
P14 Q14	AEQ SPD	0 1 2 3	0 1 2 3	The control response speed for the adaptive equalization filter is set in four levels. The sensitivity is highest with 0 and lowest with 3.	Yes	Factory use only Do not change any setting
P15 Q15	HLD SEN	0 1 2 3	0 1 2 3	The detection sensitivity for detection of changes in the relative speed is set in four levels. The sensitivity is highest with 0 and lowest with 3.	Yes	Factory use only Do not change any setting

Item		Set value		Setting contents and outline function explanation	BACK-UP	Remarks
No.	SUPER DISP.	No.	SUPER DISP.			
P16 Q16	FLT SEN	<u>0</u> 1 2 3	<u>0</u> 1 2 3	The detection sensitivity for the fault detection function is set in four levels. A fault status is detected when a status where a normal signal can not be detected consecutively for 5 tracks over the following track values. 0: 1/2 1: 3/4 2: 7/8 3: 15/16	Yes	Factory use only Do not change any setting
P17 Q17	PLLREV	<u>0</u> 1	<u>SLOW</u> <u>FAST</u>	The compensation speed in PLL frequency compensation mode is set in two levels	Yes	Factory use only Do not change any setting
P18 Q18	PLL PHS	<u>0</u> <u>9</u> 31	<u>0</u> <u>9</u> 31	In the PLL response speed setting, mainly the phase pull-in speed is controlled. The response speed becomes faster with larger values.	Yes	Factory use only Do not change any setting
P19 Q19	REV LEV	<u>0</u> 1 <u>2</u> 3	<u>0</u> 1 <u>2</u> 3	The strength of the frequency pull-in operation of the PLL phase comparison characteristic expansion function is controlled in four levels. The action is weakest with 0 and strongest with 3. When the data acquisition ratio at the time of special playback is bad, it can be improved by controlling this parameter.	Yes	Factory use only Do not change any setting
P20 Q20	PLL FRQ	<u>0</u> <u>8</u> 31	<u>0</u> <u>8</u> 31	The setting of the PLL response speed controls mainly the frequency pull-in speed. The response becomes faster with larger values.	Yes	Factory use only Do not change any setting
P21 Q21	MONI LIM W	<u>0</u> <u>28</u> 127	<u>0</u> <u>28</u> 127	Setting of the frequency offset tolerance value for PLL frequency monitor control The actual tolerance range in regard to the reference frequency is (set value)/10.24%.	Yes	Factory use only Do not change any setting
P22 Q22	MONI LIM N	<u>0</u> <u>28</u> 127	<u>0</u> <u>28</u> 127	Setting of the frequency offset tolerance value for PLL frequency monitor control The actual tolerance range in regard to the reference frequency is (set value)/10.24%.	Yes	Factory use only Do not change any setting
P23 Q23	TH EYE	<u>0</u> <u>110</u> 255	<u>0</u> <u>110</u> 255	Setting of the threshold value for judging the signal quality after equalization The judgment result for the signal quality is used for adaptive equalization, PLL, fault detection function, and other control.	Yes	Factory use only Do not change any setting
P24 Q24	TH ULK	<u>0</u> <u>98</u> 255	<u>0</u> <u>98</u> 255	Setting of the threshold value for judging the signal quality after equalization The judgment result for the signal quality is used for adaptive equalization, PLL, fault detection function, and other control.	Yes	Factory use only Do not change any setting
P25 Q25	TH ENV	<u>0</u> <u>16</u> 255	<u>0</u> <u>16</u> 255	Setting of the threshold value for the envelope detection signal The envelope detection signal is used for adaptive equalization filter, PLL, and AGC hold control.	Yes	Factory use only Do not change any setting
P26 Q26	PLL LIM	<u>0</u> 7	<u>0</u> 7	In the PLL response speed setting, mainly the phase pull-in speed is controlled.	Yes	Factory use only Do not change any setting
P27 Q27	VCO L	<u>0</u> <u>512</u> 1023	<u>0</u> <u>512</u> 1023	Setting of the initial value of the output voltage adjusting the VCO center frequency Adjustment is performed automatically in standby mode, but the time required for automatic adjustment can be reduced by setting this value in advance to a suitable value.	Yes	Use for electrical adjustment
P28 Q28	VCO R	<u>0</u> <u>512</u> 1023	<u>0</u> <u>512</u> 1023	The automatically adjusted value is read out and set. • Read-out is possible only at the time of EJECT, STANDBY-OFF.	Yes	Use for electrical adjustment

Item		Set value		Setting contents and outline function explanation	BACK -UP	Remarks
No.	SUPER DISP.	No.	SUPER DISP.			
P29 Q29	T L1 3A	-31 0 31	-31 0 31	<p>The initial values for six of the seven tap coefficients of the adaptive equalization filter, excluding the fixed center tap, are set for the L1 head. The tap coefficient values after adaptive equalization filter convergence at the time of standard tape playback are read out and set.</p> <ul style="list-style-type: none"> Read-out is possible only at the time of PLAY, REC. 	Yes	Use for electrical adjustment
P30 Q30	T L1 2A	-31 0 40	-31 0 40		Yes	Use for electrical adjustment
P31 Q31	T L1 1A	-88 -32 -4	-88 -32 -4		Yes	Use for electrical adjustment
P32 Q32	T L1 1B	-88 -32 -4	-88 -32 -4		Yes	Use for electrical adjustment
P33 Q33	T L1 2B	-31 0 40	-31 0 40		Yes	Use for electrical adjustment
P34 Q34	T L1 3B	-31 0 31	-31 0 31		Yes	Use for electrical adjustment
P35 Q35	T L2 3A	-31 0 31	-31 0 31	<p>The initial values for six of the seven tap coefficients of the adaptive equalization filter, excluding the fixed center tap, are set for the L2 head. The tap coefficient values after adaptive equalization filter convergence at the time of standard tape playback are read out and set.</p> <ul style="list-style-type: none"> Read-out is possible only at the time of PLAY, REC. 	Yes	Use for electrical adjustment
P36 Q36	T L2 2A	-31 0 40	-31 0 40		Yes	Use for electrical adjustment
P37 Q37	T L2 1A	-88 -32 -4	-88 -32 -4		Yes	Use for electrical adjustment
P38 Q38	T L2 1B	-88 -32 -4	-88 -32 -4		Yes	Use for electrical adjustment
P39 Q39	T L2 2B	-40 0 31	-40 0 31		Yes	Use for electrical adjustment
P40 Q40	T L2 3B	-31 0 31	-31 0 31		Yes	Use for electrical adjustment
P41 Q41	T R1 3A	-31 0 31	-31 0 31	<p>The initial values for six of the seven tap coefficients of the adaptive equalization filter, excluding the fixed center tap, are set for the R1 head. The tap coefficient values after adaptive equalization filter convergence at the time of standard tape playback are read out and set.</p> <ul style="list-style-type: none"> Read-out is possible only at the time of PLAY, REC. 	Yes	Use for electrical adjustment
P42 Q42	T R1 2A	-31 0 40	-31 0 40		Yes	Use for electrical adjustment
P43 Q43	T R1 1A	-88 -32 -4	-88 -32 -4		Yes	Use for electrical adjustment

Item		Set value		Setting contents and outline function explanation	BACK -UP	Remarks
No.	SUPER DISP.	No.	SUPER DISP.			
P44 Q44	T R1 1B	-88 -32 -4	-88 -32 -4	The initial values for six of the seven tap coefficients of the adaptive equalization filter, excluding the fixed center tap, are set for the R1 head. The tap coefficient values after adaptive equalization filter convergence at the time of standard tape playback are read out and set. • Read-out is possible only at the time of PLAY, REC.	Yes	Use for electrical adjustment
P45 Q45	T R1 2B	-31 0 40	-31 0 40		Yes	Use for electrical adjustment
P46 Q46	T R1 3B	-31 0 31	-31 0 31		Yes	Use for electrical adjustment
P47 Q47	T R2 3A	-31 0 31	-31 0 31	The initial values for six of the seven tap coefficients of the adaptive equalization filter, excluding the fixed center tap, are set for the R2 head. The tap coefficient values after adaptive equalization filter convergence at the time of standard tape playback are read out and set. • Read-out is possible only at the time of PLAY, REC.	Yes	Use for electrical adjustment
P48 Q48	T R2 2A	-31 0 40	-31 0 40		Yes	Use for electrical adjustment
P49 Q49	T R2 1A	-88 -32 -4	-88 -32 -4		Yes	Use for electrical adjustment
P50 Q50	T R2 1B	-88 -32 -4	-88 -32 -4	The initial values for six of the seven tap coefficients of the adaptive equalization filter, excluding the fixed center tap, are set for the R2 head. The tap coefficient values after adaptive equalization filter convergence at the time of standard tape playback are read out and set. • Read-out is possible only at the time of PLAY, REC.	Yes	Use for electrical adjustment
P51 Q51	T R2 2B	-40 0 31	-40 0 31		Yes	Use for electrical adjustment
P52 Q52	T R2 3B	-31 0 31	-31 0 31		Yes	Use for electrical adjustment
P53 Q53	IC READ	0 1 2	OFF SINGLE CONT	The following data are read out from the EQ200 IC. However, there are limitations according to the mode. <u>Data which can be read-out only at the time of PLAY, REC</u> ENV L1 ENV L2 ENV R1 ENV R1 T L1 3A T L1 2A T L1 1A T L1 1B T L1 2B T L1 3B T L2 3A T L2 2A T L2 1A T L2 1B T L2 2B T L2 3B T R1 3A T R1 2A T R1 1A T R1 1B T R1 2B T R1 3B T R2 3A T R2 2A T R2 1A T R2 1B T R2 2B T R2 3B <u>Data which can be read-out only at the time of EJECT, STANDBY-OFF</u> VCO L VCO R 0: No read-out 1: Read-out each time the SET button is pressed. 2: Read-out is performed once every second. • The setting is held until exit from PB ADJUST.	No	Use for electrical adjustment
P60 Q60	VITERBI MODE	0 1 2 3	OFF PR4 EPR4 AUTO	Setting whether Viterbi decoding is to be used for detection of playback data or not • The setting is held until exit from 50M ADJUST, 25M ADJUST.	No	Use for electrical adjustment

Item		Set value		Setting contents and outline function explanation	BACK -UP	Remarks
No.	SUPER DISP.	No.	SUPER DISP.			
P61 Q61	EQ STB	0 1	OFF ON	ON/OFF setting for the automatic standby detection function Automatic standby detection function: When the playback envelope is not detected for several seconds, the mode automatically shifts to standby mode (the mode where playback processing is stopped and the VCO center frequency is adjusted automatically). • The setting is held until exit from 50M ADJUST, 25M ADJUST.	No	Factory use only
P62 Q62	AEQ MODE	0 1	OFF ON	Setting of the Adaptive EQ function of the adaptive equalization filter • The setting is held until exit from 50M ADJUST, 25M ADJUST.	No	Use for electrical adjustment
P63 Q63	AEQ HOLD	0 1	OFF ON	ON/OFF setting for the function for temporary holding of adaptive equalization control during the transitional period when the relative speed changes. • The setting is held until exit from 50M ADJUST, 25M ADJUST.	No	Factory use only
P64 Q64	FLT MODE	0 1	OFF ON	ON/OFF setting for the fault detection function Fault detection function: When the adaptive filter or the PLL drops into a divergent state at the time of mode switching like search etc., and a status is detected where no normal signal can be detected over a period of 5 tracks or more, this function pulls the status of the adaptive filter or the PLL to the initial status. • The setting is held until exit from 50M ADJUST, 25M ADJUST.	No	Factory use only
P65 Q65	PLL MONI	0 1	OFF ON	ON/OFF setting for PLL frequency monitor control Frequency monitor control: When a status is detected where the playback clock frequency at the time of mode switching during palyback is outside the permissible range set by MONI LIM PB1 for the specified time or longer, this function automatically pulls the frequency back to the reference frequency corresponding to the relative speed. • The setting is held until exit from 50M ADJUST, 25M ADJUST.	No	Factory use only
P66 Q66	MONI KINDSEL	1 2 3	ENV EYEE EYEO	Selection of monitor signal • The setting is held until exit from 50M ADJUST, 25M ADJUST.	No	Use for electrical adjustment
P67 Q67	MONI CHSEL	0 1 2 3 4	OFF PBL PBR RPL RPR	Selection of monitor channel (Head) • The setting is held until exit from 50M ADJUST, 25M ADJUST.	No	Use for electrical adjustment
P68 Q68	ECC MODE	0 1 2	ALL ON OT OFF AL OFF	Setting of error correction control 0: Error correction for INNER and OUTER. 1: Error correction only for INNER, but not for OUTER. 2: No error correction for INNER and OUTER. • The setting is held until exit from 50M ADJUST, 25M ADJUST.	No	
P69 Q69	CONCEAL MOD	0 1	ON OFF	Setting of error revision control 0: Error revision is performed. 1: Error revision is not performed. • The setting is held until exit from 50M ADJUST, 25M ADJUST.	No	
P70 Q70	ERROR MODE	0 1	FAST SLOW	Setting of the error sampling time 0: FAST mode 1: SLOW mode • The setting is held until exit from 50M ADJUST, 25M ADJUST.	No	
P71 Q71	TRACKING MOD	0 1	ATF CTL	Tracking mode setting 0: ATF tracking 1: CTL tracking • The setting is held until exit from 50M ADJUST, 25M ADJUST.	No	
P72 Q72	TRACKING VAL	-128 0 127	-128 0 127	Offset value setting for CTL tracking • Effective only at the time of TRACKING MOD = CTL. • The setting is held until exit from 50M ADJUST, 25M ADJUST.	No	
P73 Q73	ATF HEAD	0 1	PB RP	Head selection for ATF tracking 0: PB head 1: RP head	No	

RP ADJUST (DVCPRO 50M ADJUST, DVCPRO 25M ADJUST, DV ADJUST sub-screen)

Item		Set value		Setting contents and outline function explanation	BACK-UP	Remarks
No.	SUPER DISP.	No.	SUPER DISP.			
P01 Q01 R01	AGC LEV L1	-128 -20 127	-128 -20 127	Adjustment of the L1 head playback phase	Yes	Use for electrical adjustment
P02 Q02 R02	AGC LEV L2	-128 -20 127	-128 -20 127	Adjustment of the L2 head playback phase	Yes	Use for electrical adjustment
P03 Q03 R03	ATF MAG L1	-128 20 127	-128 20 127	Adjustment of the L1 head playback amplitude	Yes	Use for electrical adjustment
P04 Q04 R04	ATF MAG L2	-128 20 127	-128 20 127	Adjustment of the L2 head playback amplitude	Yes	Use for electrical adjustment
P05 Q05 R05	AGC LEV R1	-128 -20 127	-128 -20 127	Adjustment of the R1 head playback phase	Yes	Use for electrical adjustment
P06 Q06 R06	AGC LEV R2	-128 -20 127	-128 -20 127	Adjustment of the R2 head playback phase	Yes	Use for electrical adjustment
P07 Q07 R07	MAG R1	-128 20 127	-128 20 127	Adjustment of the R1 head playback amplitude	Yes	Use for electrical adjustment
P08 Q08 R08	MAG R2	-128 20 127	-128 20 127	Adjustment of the R2 head playback amplitude	Yes	Use for electrical adjustment
P09 Q09 R09	ENV L1	0 255	0 255	Playback signal envelope level read-out value averaged for each track of each head ENV L1: L1 head ENV L2: L2 head Averaging is performed at 8 points in the track, and the newest track value for which averaging has been completed at the time when read-out is started will be read out. • Read-out is possible only at the time of PLAY and REC.	Yes	Factory use only
P10 Q10 R10	ENV L2	0 255	0 255		Yes	Factory use only
P11 Q11 R11	ENV R1	0 255	0 255		Yes	Factory use only
P12 Q12 R12	ENV R2	0 255	0 255		Yes	Factory use only
P13 Q13 R13	AGC SPD	0 3	0 3	Setting of the AGC response speed	Yes	Factory use only Do not change any setting
P14 Q14 R14	AEQ SPD	0 1 2 3	0 1 2 3	The control response speed for the adaptive equalization filter is set in four levels. The sensitivity is highest with 0 and lowest with 3.	Yes	Factory use only Do not change any setting
P15 Q15 R15	HLD SEN	0 1 2 3	0 1 2 3	The detection sensitivity for detection of changes in the relative speed is set in four levels. The sensitivity is highest with 0 and lowest with 3.	Yes	Factory use only Do not change any setting

Item		Set value		Setting contents and outline function explanation	BACK-UP	Remarks
No.	SUPER DISP.	No.	SUPER DISP.			
P16 Q16 R16	FLT SEN	0 1 2 3	0 1 2 3	The detection sensitivity for the fault detection function is set in four levels. A fault status is detected when a status where a normal signal can not be detected consecutively for 5 tracks over the following track values. 0: 1/2, 1: 3/4, 2: 7/8, 3: 15/16	Yes	Factory use only Do not change any setting
P17 Q17 R17	PLLREV	0 1	SLOW FAST	The compensation speed in PLL frequency compensation mode is set in two levels	Yes	Factory use only Do not change any setting
P18 Q18 R18	PLL PHS	0 9 31	0 9 31	In the PLL response speed setting, mainly the phase pull-in speed is controlled. The response speed becomes faster with larger values.	Yes	Factory use only Do not change any setting
P19 Q19 R19	REV LEV	0 1 2 3	0 1 2 3	The strength of the frequency pull-in operation of the PLL phase comparison characteristic expansion function is controlled in four levels. The action is weakest with 0 and strongest with 3. When the data acquisition ratio at the time of special playback is bad, it can be improved by controlling this parameter.	Yes	Factory use only Do not change any setting
P20 Q20 R20	PLL FRQ	0 8 31	0 8 31	The setting of the PLL response speed controls mainly the frequency pull-in speed. The response becomes faster with larger values.	Yes	Factory use only Do not change any setting
P21 Q21 R21	MONI LIM W	0 28 127	0 28 127	Setting of the frequency offset tolerance value for PLL frequency monitor control The actual tolerance range in regard to the reference frequency is (set value)/10.24%.	Yes	Factory use only Do not change any setting
P22 Q22 R22	MONI LIM N	0 28 127	0 28 127	Setting of the frequency offset tolerance value for PLL frequency monitor control The actual tolerance range in regard to the reference frequency is (set value)/10.24%.	Yes	Factory use only Do not change any setting
P23 Q23 R23	TH EYE	0 110 255	0 110 255	Setting of the threshold value for judging the signal quality after equalization The judgment result for the signal quality is used for adaptive equalization, PLL, fault detection function, and other control.	Yes	Factory use only Do not change any setting
P24 Q24 R24	TH ULK	0 98 255	0 98 255	Setting of the threshold value for judging the signal quality after equalization The judgment result for the signal quality is used for adaptive equalization, PLL, fault detection function, and other control.	Yes	Factory use only Do not change any setting
P25 Q25 R25	TH ENV	0 16 255	0 16 255	Setting of the threshold value for the envelope detection signal The envelope detection signal is used for adaptive equalization filter, PLL, and AGC hold control.	Yes	Factory use only Do not change any setting
P26 Q26 R26	PLL LIM	0 7	0 7	In the PLL response speed setting, mainly the phase pull-in speed is controlled.	Yes	Factory use only Do not change any setting
P27 Q27 R27	VCO L	0 512 1023	0 512 1023	Setting of the initial value of the output voltage adjusting the VCO center frequency Adjustment is performed automatically in standby mode, but the time required for automatic adjustment can be reduced by setting this value in advance to a suitable value. The automatically adjusted value is read out and set. • Read-out is possible only at the time of EJECT, STANDBY-OFF.	Yes	Use for electrical adjustment
P28 Q28 R28	VCO R	0 512 1023	0 512 1023	Operation: • At the time of P53, Q53: IC READ = SINGLE Read-out and display are performed each time the SET button is pressed. • At the time of P53, Q53: IC READ = CONT Read-out and display are performed once every second.	Yes	Use for electrical adjustment
P29 Q29 R29	T L1 3A	-31 0 31	-31 0 31	The initial values for six of the seven tap coefficients of the adaptive equalization filter, excluding the fixed center tap, are set for the L1 head. The tap coefficient values after adaptive equalization filter convergence at the time of standard tape playback are read out and set.	Yes	Use for electrical adjustment

Item		Set value		Setting contents and outline function explanation	BACK-UP	Remarks
No.	SUPER DISP.	No.	SUPER DISP.			
P30 Q30 R30	T L1 2A	-31 0 40	-31 0 40	<ul style="list-style-type: none"> Read-out is possible only at the time of PLAY, REC. Operation: <ul style="list-style-type: none"> At the time of P53, Q53: IC READ = SINGLE Read-out and display are performed each time the SET button is pressed. At the time of P53, Q53: IC READ = CONT Read-out and display are performed once every second. 	Yes	Use for electrical adjustment
P31 Q31 R31	T L1 1A	-88 -32 -4	-88 -32 -4		Yes	Use for electrical adjustment
P32 Q32 R32	T L1 1B	-88 -32 -4	-88 -32 -4	The initial values for six of the seven tap coefficients of the adaptive equalization filter, excluding the fixed center tap, are set for the L1 head. The tap coefficient values after adaptive equalization filter convergence at the time of standard tape playback are read out and set. <ul style="list-style-type: none"> Read-out is possible only at the time of PLAY, REC. Operation: <ul style="list-style-type: none"> At the time of P53, Q53: IC READ = SINGLE Read-out and display are performed each time the SET button is pressed. At the time of P53, Q53: IC READ = CONT Read-out and display are performed once every second. 	Yes	Use for electrical adjustment
P33 Q33 R33	T L1 2B	-31 0 40	-31 0 40		Yes	Use for electrical adjustment
P34 Q34 R34	T L1 3B	-31 0 31	-31 0 31		Yes	Use for electrical adjustment
P35 Q35 R35	T L2 3A	-31 0 31	-31 0 31	The initial values for six of the seven tap coefficients of the adaptive equalization filter, excluding the fixed center tap, are set for the L2 head. The tap coefficient values after adaptive equalization filter convergence at the time of standard tape playback are read out and set. <ul style="list-style-type: none"> Read-out is possible only at the time of PLAY, REC. Operation: <ul style="list-style-type: none"> At the time of P53, Q53: IC READ = SINGLE Read-out and display are performed each time the SET button is pressed. At the time of P53, Q53: IC READ = CONT Read-out and display are performed once every second. 	Yes	Use for electrical adjustment
P36 Q36 R36	T L2 2A	-31 0 40	-31 0 40		Yes	Use for electrical adjustment
P37 Q37 R37	T L2 1A	-88 -32 -4	-88 -32 -4		Yes	Use for electrical adjustment
P38 Q38 R38	T L2 1B	-88 -32 -4	-88 -32 -4		Yes	Use for electrical adjustment
P39 Q39 R39	T L2 2B	-40 0 31	-40 0 31		Yes	Use for electrical adjustment
P40 Q40 R40	T L2 3B	-31 0 31	-31 0 31		Yes	Use for electrical adjustment
P41 Q41 R41	T R1 3A	-31 0 31	-31 0 31		Yes	Use for electrical adjustment
P42 Q42 R42	T R1 2A	-31 0 40	-31 0 40	<ul style="list-style-type: none"> Read-out is possible only at the time of PLAY, REC. Operation: <ul style="list-style-type: none"> At the time of P53, Q53: IC READ = SINGLE Read-out and display are performed each time the SET button is pressed. At the time of P53, Q53: IC READ = CONT Read-out and display are performed once every second. 	Yes	Use for electrical adjustment
P43 Q43 R43	T R1 1A	-88 -32 -4	-88 -32 -4		Yes	Use for electrical adjustment

Item		Set value		Setting contents and outline function explanation	BACK -UP	Remarks
No.	SUPER DISP.	No.	SUPER DISP.			
P44 Q44 R44	T R1 1B	-88 -32 -4	-88 -32 -4	The initial values for six of the seven tap coefficients of the adaptive equalization filter, excluding the fixed center tap, are set for the R2 head. The tap coefficient values after adaptive equalization filter convergence at the time of standard tape playback are read out and set. • Read-out is possible only at the time of PLAY, REC. Operation: • At the time of P53, Q53: IC READ = SINGLE Read-out and display are performed each time the SET button is pressed. • At the time of P53, Q53: IC READ = CONT Read-out and display are performed once every second.	Yes	Use for electrical adjustment
P45 Q45 R45	T R1 2B	-31 0 40	-31 0 40		Yes	Use for electrical adjustment
P46 Q46 R46	T R1 3B	-31 0 31	-31 0 31		Yes	Use for electrical adjustment
P47 Q47 R47	T R2 3A	-31 0 31	-31 0 31		Yes	Use for electrical adjustment
P48 Q48 R48	T R2 2A	-31 0 40	-31 0 40		Yes	Use for electrical adjustment
P49 Q49 R49	T R2 1A	-88 -32 -4	-88 -32 -4		Yes	Use for electrical adjustment
P50 Q50 R50	T R2 1B	-88 -32 -4	-88 -32 -4		Yes	Use for electrical adjustment
P51 Q51 R51	T R2 2B	-40 0 31	-40 0 31		Yes	Use for electrical adjustment
P52 Q52 R52	T R2 3B	-31 0 31	-31 0 31	Yes	Use for electrical adjustment	
P53 Q53 R53	IC READ	0 1 2	OFF SINGLE CONT	The following data are read out from the EQ200 IC. However, there are limitations according to the mode. <u>Data which can be read-out only at the time of PLAY, REC</u> ENV L1 ENV L2 ENV R1 ENV R1 T L1 3A T L1 2A T L1 1A T L1 1B T L1 2B T L1 3B T L2 3A T L2 2A T L2 1A T L2 1B T L2 2B T L2 3B T R1 3A T R1 2A T R1 1A T R1 1B T R1 2B T R1 3B T R2 3A T R2 2A T R2 1A T R2 1B T R2 2B T R2 3B <u>Data which can be read-out only at the time of EJECT, STANDBY-OFF</u> VCO L VCO R 0: No read-out 1: Read-out each time the SET button is pressed. 2: Read-out is performed once every second. • The setting is held until exit from RP ADJUST.	No	Use for electrical adjustment
P60 Q60 R60	VITERBI MODE	0 1 2 3	OFF PR4 EPR4 AUTO	Setting whether Viterbi decoding is to be used for detection of playback data or not • The setting is held until exit from 50M ADJUST, 25M ADJUST DV ADJUST.	No	Use for electrical adjustment

Item		Set value		Setting contents and outline function explanation	BACK-UP	Remarks
No.	SUPER DISP.	No.	SUPER DISP.			
P61 Q61 R61	EQ STB	0 — 1	OFF — ON	ON/OFF setting for the automatic standby detection function Automatic standby detection function: When the playback envelope is not detected for several seconds, the mode automatically shifts to standby mode (the mode where playback processing is stopped and the VCO center frequency is adjusted automatically). • The setting is held until exit from 50M ADJUST, 25M ADJUST DV ADJUST.	No	Factory use only
P62 Q62 R62	AEQ MODE	0 — 1	OFF — ON	Setting of the Adaptive EQ function of the adaptive equalization filter • The setting is held until exit from 50M ADJUST, 25M ADJUST.	No	Use for electrical adjustment
P63 Q63 R63	AEQ HOLD	0 — 1	OFF — ON	ON/OFF setting for the function for temporary holding of adaptive equalization control during the transitional period when the relative speed changes. • The setting is held until exit from 50M ADJUST, 25M ADJUST DV ADJUST.	No	Factory use only
P64 Q64 R64	FLT MODE	0 — 1	OFF — ON	ON/OFF setting for the fault detection function Fault detection function: When the adaptive filter or the PLL drops into a divergent state at the time of mode switching like search etc., and a status is detected where no normal signal can be detected over a period of 5 tracks or more, this function pulls the status of the adaptive filter or the PLL to the initial status. • The setting is held until exit from 50M ADJUST, 25M ADJUST DV ADJUST.	No	Factory use only
P65 Q65 R65	PLL MONI	0 — 1	OFF — ON	ON/OFF setting for PLL frequency monitor control Frequency monitor control: When a status is detected where the playback clock frequency at the time of mode switching during palyback is outside the permissible range set by MONI LIM PB1 for the specified time or longer, this function automatically pulls the frequency back to the reference frequency corresponding to the relative speed. • The setting is held until exit from 50M ADJUST, 25M ADJUST DV ADJUST.	No	Factory use only
P66 Q66 R66	MONI KINDSEL	— 1 2 3	ENV EYEE EYEO	Selection of monitor signal • The setting is held until exit from 50M ADJUST, 25M ADJUST DV ADJUST.	No	Use for electrical adjustment
P67 Q67 R67	MONI CHSEL	— 0 1 2 3 4	OFF PBL PBR RPL RPR	Selection of monitor channel(Head) • The setting is held until exit from 50M ADJUST, 25M ADJUST DV ADJUST.	No	Use for electrical adjustment
P68 Q68 R68	ECC MODE	— 0 1 2	ALL ON OT OFF AL OFF	Setting of error correction control 0: Error correction for INNER and OUTER. 1: Error correction only for INNER, but not for OUTER. 2: No error correction for INNER and OUTER. • The setting is held until exit from 50M ADJUST, 25M ADJUST DV ADJUST.	No	
P69 Q69 R69	CONCEAL MOD	— 0 1	— ON — OFF	Setting of error revision control 0: Error revision is performed. 1: Error revision is not performed. • The setting is held until exit from 50M ADJUST, 25M ADJUST DV ADJUST.	No	
P70 Q70 R70	ERROR MODE	— 0 1	— FAST — SLOW	Setting of the error sampling time 0: FAST mode 1: SLOW mode • The setting is held until exit from 50M ADJUST, 25M ADJUST DV ADJUST.	No	
P71 Q71	TRACKING MOD	— 0 1	— ATF — CTL	Tracking mode setting 0: ATF tracking 1: CTL tracking • The setting is held until exit from 50M ADJUST, 25M ADJUST DV ADJUST.	No	
P72 Q72 R72	TRACKING VAL	-128 — 0 127	-128 — 0 127	Offset value setting for CTL tracking • Effective only at the time of TRACKING MOD = CTL. • The setting is held until exit from 50M ADJUST, 25M ADJUST DV ADJUST.	No	
P73 Q73 R73	ATF HEAD	— 0 1	PB RP	Head selection for ATF tracking 0: PB head 1: RP head	No	

F00: VIDEO ADJUST

Item		Set value		Setting contents and outline function explanation	BACK-UP	Remarks
No.	SUPER DISP.	No.	SUPER DISP.			
F03	VIDEO MUTE	0 1	NORMAL MUTE	This menu is only for Factory use. Select whether the VIDEO output is to be made gray or not 0:Normal output 1:Forced gray output	No	
F10	TELETEXT INI	0 1	MOJI NABTS	Factory default setting of Menu No802 : TELETEXT INI is selected. 0:MOJI (Shipping for T) 1:NABTS (Shipping for P, E) * Menu No802 is only valid for 525 mode.	Yes	
F11	V SETUP	0 1	OFF ON	Switching of effective/not effective for SETUP-MENU 622: SETUP 25, 623:SETUP50 0:SETUP-MENU 622: SETUP 25, 623: SETUP50 is not displayed and THRU is sent forcibly to AV. (Shipping setting for T) 1:SETUP-MENU 622: SETUP 25, 623: SETUP50 is displayed and the set value is sent to AV. (Shipping setting for P, E) Menu No 622, 623 is only valid for 525 mode.	Yes	
F15	22L BLANK	0 1	OFF ON	Switching of effective/not effective for SETUP-MENU 805: 22 & 285 BLANK 0:SETUP-MENU 805: 22 & 285 BLANK is not displayed and OFF is sent forcibly to AV. (Shipping setting for P, E) 1:SETUP-MENU 805: 22 & 285 BLANK is displayed and the set value is sent to AV. (Shipping setting for T)	Yes	
F17	GAP COUNT	0 40 64	0 40 64	Setting of the GAP COUNT for DVCPRO I/F This menu is only for Factory use.	Yes	
F18	DIF PLL TEST	0 1	OFF ON	Set it "ON" for PLL adjustment on the AVMON Board..	Yes	

G00: AUDIO ADJUST

Item		Set value		Setting contents and outline function explanation	BACK-UP	Remarks
No.	SUPER DISP.	No.	SUPER DISP.			
G01	REF_LEVEL1	0 1 2	FS-20 FS-18 FS-12	Selection of the audio I/O reference level 0: Full scale -20 dB (Shipping setting for T,P) 1: Full scale -18 dB (Shipping setting for E) 2: Full scale -12 dB • Change of the set value is possible only when G02: REF_LEVEL2 = 0 dB has been set. • The marker for REF LEVEL is not displayed on the Front Panel when FS-12 is selected with FINE mode (front meter).	Yes	
G02	REF_LEVEL2	0 1	0dB -3dB	Selection of the SETUP-MENU set value for switching of the audio I/O reference level. • Set value change is possible only when G01:REF LEVEL 1 = FS-18 has been set.	Yes	
G03	REF LV INI	0 1	0dB 4dB	Setting of the factory default value of the SETUP-MENU for audio I/O reference level switching. 701:CH1 IN LV 707:CH2 OUT LV 702:CH2 IN LV 708:CH3 OUT LV 703:CH3 IN LV 709:CH4 OUT LV 704:CH4 IN LV 710:CUE OUT LV 705:CUE IN LV 711:MONIL OUT LV 706:CH1 OUT LV 712:MONIR OUT LV 0: 0 dB (Shipping setting for P,E) 1: 4 dB (Shipping setting for T)	Yes	
G05	AES PHS CORR	0 1	NORMAL OFF	Select whether AES/EBU output is synchronized with Video output or not. 0: AES/EBU is synchronized with Video Output. 1: AES/EBU is not synchronized with Video Output.	Yes	
G08	AUD PB MODE	0 1	MODE1 MODE2	Setting of audio playback mode 0: NOMAL Mode 1: Setting is carried out when directly editing the jointed tape on which recording was performed with a camera recorder or playing back the edited tape.	Yes	

H00: OTHER ADJUST

Item		Set value		Setting contents and outline function explanation	BACK -UP	Remarks
No.	SUPER DISP.	No.	SUPER DISP.			
H01	STILL LIMIT	<u>0</u> 1	<u>2 min</u> 6 min	Set the maximum value of the "SETUP-MENU 400 : STILL TIMER". Decide whether the still timer should be reset when the STANDBY-ON command is received during the STOP mode. 0:2 min/The still timer should not be reset 1:6 min/The still timer should be reset	Yes	
H02	LTC OUT SEL	<u>0</u> 1	<u>N-STOP</u> STOP	Selection of TC output according to the mode or not 0: Output always, independent of the mode 1: ON/OFF switching of the TC output according to the VTR mode. However, the TC output always is ON at the time of SETUP MENU 317: AUD MEM MODE = AMU_X, AMU_VO.	Yes	

H02: TC output in case of LTC OUT SEL = STOP setting

TC INT/EXT	Mode	VV / EE	TC output
INT	EJECT STOP STANDBY OFF JOG/VAR/SHTL STILL	—	OFF
	Others	—	ON
EXT	EJECT STOP STANDBY OFF JOG/VAR/SHTL STILL	V V (including BLACK, GLAY of EJECT)	OFF
		EE	ON
	Others	—	ON

14. ERROR MESSAGES

If "T&S&M" is selected in the setup menu No. 008 (DISPLAY SEL), a message appears in the modedisplay whenever a warning or error occurs. When multiple events occur, the event with the highest priority is displayed.

Priority	Display	Description
<div>High</div> <div>↑</div> <div>↓</div> <div>Low</div>	Error messages (See error message table)	When an operational malfunction has occurred in the unit, the error number flashes and the error message is indicated on the counter display.
	INT SG	When SG has been selected as the input signal by the INPUT SELECT button, the "INT SG" display will appear for the first two seconds at the start of operation (E-E mode) when the REC button is pressed.
	NO INPUT	If there are no input signals--with the exception of the analog audio signals--supplied to the connectors selected by the INPUT SELECT button, the "NO INPUT" display will appear for the first two seconds at the start of operation (E-E mode) when the REC button is pressed.
	Warning messages (See error message table)	When a warning occurs in this unit, the error number and warning message are indicated on the counter display. When multiple warnings occur, the warning with the highest priority is displayed.

■ UMID information display

This is displayed when UMID information is present on the input signal in E-E mode.

This lamp lights during tape playback when UMID information has been recorded on the tape. "NO-INFO" is displayed when there is no UMID information.


Display	Description
MATNO	Material number
COPY	Instance number (No. of copies)
OWNR	Country, organization, user
POS	Reception status from GPS satellites when recording spatial coordinates (height above sea level, longitude and latitude): HOLD : No reception from any satellite 2D : Reception possible, but number of satellites is insufficient. Height above sea level will not be accurate. 3D : Good reception
DATE	Date
TIME	UTC (Coordinated Universal Time) and time difference with UTC

■ Displaying the warning information

- A warning message appears when a warning has occurred. "NO WARNING" appears when a warning has not occurred.
- When more than one warning has occurred simultaneously, move the joystick up or down to check the description of each warning.

■ Warning messages

Priority	Monitor display	Description	Corrective action	VTR operation
High ↑ ↓ (Low)	E-04 (UNKNOWN SIG)	This appears when the signals supplied from the IEEE 1394 digital interface are not DVCPRO/DV format signals.	Check that the 1394 input has been connected properly.	No recording operations are possible.
	E-11 (NOT 1x 25M SIG)	This appears when the signals supplied from the IEEE 1394 digital interface are not DVCPRO/DV (25 Mbps) format 1x transfer signals.	Check the 1394 input signals.	No recording operations are possible.
	E-12 (NOT 1x 50M SIG)	This appears when the signals supplied from the IEEE 1394 digital interface are not DVCPRO50 (50 Mbps) format 1x transfer signals.	Check the 1394 input signals.	No recording operations are possible.
	E-16 (INVALID VIDEO SIG)	This appears when the compressed video signals supplied from the IEEE 1394 digital interface are irregular signals. • This warning appears only during recording operations. In such cases, no signals are recorded on the tape, and only erasure of existing signals is performed.	Check the 1394 input signals. It is possible that playback signals of an unrecorded tape are being input.	Operation cannot be continued.
	E-17 (INVALID AUDIO SIG)	This appears when the audio signals supplied from the IEEE 1394 digital interface are irregular signals. • This warning appears only during recording operations. In such cases, the signals are recorded with the audio signals muted.	Check the 1394 input signals. It is possible that signals other than 1x playback signals are being input from a VTR or other device.	Operation cannot be continued.
	E-18 (INVALID TC SIG)	This appears when the time code information supplied from the IEEE 1394 digital interface is irregular information. • This warning appears only during recording operations. In such cases, the internally generated time code is recorded.	Check the time code of the device which is supplying the time code.	Operation cannot be continued.
	E-92 (1394 INITIAL ERROR)	This appears when the connection status of the IEEE 1394 digital interface is irregular.	If a loop-through format has been adopted for the cable connections, re-connect each of the cables on a 1:1 basis. If such a format has not been adopted, set the POWER switch to OFF and then back to ON.	Signal input and output through the IEEE 1394 digital interface is stopped.
	E-10 (FAN STOP)	This appears when the fan motor has shut down.	Check the fan for foreign matter.	Operation continues.
	E-09 (NO RF)	This appears when a blank section lasting for more than one second on the tape has been detected during playback. A blank section is identified as such when all the following conditions are met: • There are no output signals from any of the heads. • The playback data cannot be read. • There is no CTL signal (DV/DVCAM tapes excluded).	Check the tape. It is possible that an unrecorded tape has been loaded.	Operation continues.
	E-00 (SERVO NOT LOCKED)	This appears when the servo is not locked for three or more seconds during playback or recording.	Check the tape. It is possible that a tape recorded by a system other than 525/60 has been loaded.	Operation continues.

Priority	Monitor display	Description	Corrective action	VTR operation
 Low	E-01 (LOW RF)	This appears when an envelope level approximately one-third of the normal level has been detected for more than one second during playback or recording.	Clean the video heads.	Operation continues.
	E-02 (HIGH ERROR RATE)	This appears when the error rate has increased to the extent that correction or interpolation was applied to either the video or audio playback signals.	Clean the video heads.	Operation continues.

■ Error messages

Monitor display	Description	Corrective action	VTR operation
E-20 DEW	<p>If condensation is detected, the error number flashes and the unit transfers to eject mode. The drum rotates after the cassette is ejected to eliminate the condensation.</p> <p>Once the unit is released from condensation status, the error message display is cleared and the VTR is able to be used.</p> <ul style="list-style-type: none"> • If condensation is detected in the eject mode, the drum starts rotating as soon as it is detected. • If condensation is detected when the cassette has been inserted, the drum rotation is stopped, and after the tape is ejected, the drum starts rotating. 	Leave the power on and wait.	EJECT
E-29 FRONT LOAD MOTOR	<p>The unit switches to eject mode and if the cassette fails to move up within 6 seconds, this error number flashes on the display.</p> <p>Note: If the cassette does not move down inside the machine even when 6 seconds have elapsed since the cassette was inserted, the VTR is transferred to the eject mode.</p>	Set the POWER switch to OFF and then to ON again.	STOP
E-31 LOADING MOTOR	<p>If the unloading operation is not completed within 6 seconds, this error number flashes on the display.</p> <p>Note: When the loading operation is not completed within 6 seconds, the VTR is transferred to the eject (unloading) mode.</p>	Set the POWER switch to OFF and then to ON again.	STOP
E-35 SERVO CONTROL ERROR	If there is no response from the servo microcomputer for 1 second or more, this error number flashes on the display.	Set the POWER switch to OFF and then to ON again.	STOP
E-37 SERVO COMM ERROR	If 10 seconds or more elapses and the servo microcomputer has not followed orders issued by the system control microcomputer, this error number flashes on the display.	Set the POWER switch to OFF and then to ON again.	STOP
E-51 FRONT LOAD ERROR	If the take-up reel rotates without engaging for a specific period of time during the start or end processing operation while loading is underway (half position), this error number flashes on the display.	Set the POWER switch to OFF and then to ON again.	STOP

Monitor display	Description	Corrective action	VTR operation
E-52 W-UP REEL NOT ROTA	If the take-up reel fails to take up the tape while the tape is traveling in the state where the total amount of the tape has not yet been detected after the cassette was inserted, this error number flashes on the display.	Set the POWER switch to OFF and then to ON again.	STOP
E-53 WINDUP ERROR	If there is an abnormally large discrepancy between the amount of tape taken up by the take-up reel and the amount of tape supplied by the supply reel while the tape is traveling after the total amount of the tape begins to be detected, this error number flashes on the display.	Set the POWER switch to OFF and then to ON again.	STOP
E-55 UNLOAD ERROR	If the tape has not been taken up during unloading, this error number flashes on the display.	Set the POWER switch to OFF and then to ON again.	STOP
E-57 S-FF/REW TIMEOVER	If the start or end processing operation is not completed, this error number flashes on the display.	Set the POWER switch to OFF and then to ON again.	STOP
E-59 DRUM ROTA TOO SLOW	If the cylinder motor speed is abnormally low, this error number flashes on the display.	Set the POWER switch to OFF and then to ON again.	STOP
E-60 DRUM ROTA TOO FAST	If the cylinder motor speed is abnormally high, this error number flashes on the display.	Set the POWER switch to OFF and then to ON again.	STOP
E-61 CAP ROTA TOO SLOW	If the capstan motor speed is abnormally low, the error number flashes on the display.	Set the POWER switch to OFF and then to ON again.	STOP
E-64 S REEL ROTA TOO FAST	If the supply reel motor speed is abnormally high, the error number flashes on the display.	Set the POWER switch to OFF and then to ON again.	STOP
E-67 T REEL ROTA TOO FAST	If the take-up reel motor speed is abnormally high, the error number flashes on the display.	Set the POWER switch to OFF and then to ON again.	STOP
E-69 T REEL TORQUE ERR	If excess torque being applied to the take-up reel motor is detected, the error number flashes on the display.	Set the POWER switch to OFF and then to ON again.	STOP
E-70 S REEL TORQUE ERR	If excess torque being applied to the supply reel motor is detected or an abnormal current flowing to the current detection resistor is detected, this error number flashes on the display.	Set the POWER switch to OFF and then to ON again.	STOP
E-71 CAP TENSION ERROR	If abnormal tension at the supply side is detected in the capstan mode, the error number flashes on the display.	Set the POWER switch to OFF and then to ON again.	STOP
E-72 REEL TENSION ERROR	If abnormal tension at the supply side is detected in the reel mode, the error number flashes on the display.	Set the POWER switch to OFF and then to ON again.	STOP
E-73 REEL DIR UNMATCH	If the take-up reel motor has rotated in the reverse direction, this error number flashes on the display.	Set the POWER switch to OFF and then to ON again.	STOP
E-74 DRUM TORQUE ERROR	If excess torque being applied to the cylinder motor is detected, this error number flashes on the display.	Set the POWER switch to OFF and then to ON again.	STOP
E-78 M-IF COMM ERROR	If a problem has been encountered in communication between the servo microcomputer and mechanism relay board, this error number flashes on the display.	Set the POWER switch to OFF and then to ON again.	STOP

Note:

Consult your dealer if the error message is still displayed even after restarting the unit.

15. NODE UNIQUE ID (UID)

15-1. Confirmation of UID Number

IEEE1394 Module Board on the DPROC Board has "Node Unique ID". This UID number is displayed in the DIF STATUS MENU in the DIAG MENU

1. Connect a monitor TV to the Line Output of the VTR.
2. Open the "DIAG MENU".
3. Press the "Search" button twice so that the "DIF STATUS" and "UID Number" are displayed on the monitor TV. (Refer to Paragraph 9, 9-1.)

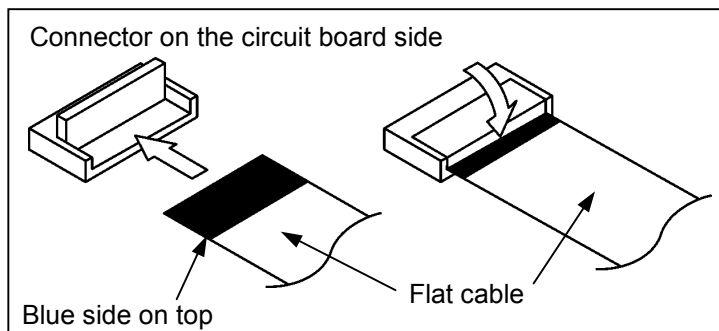
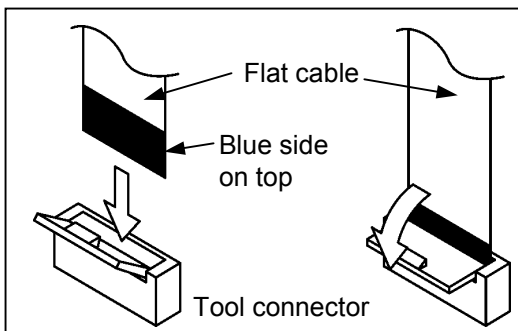
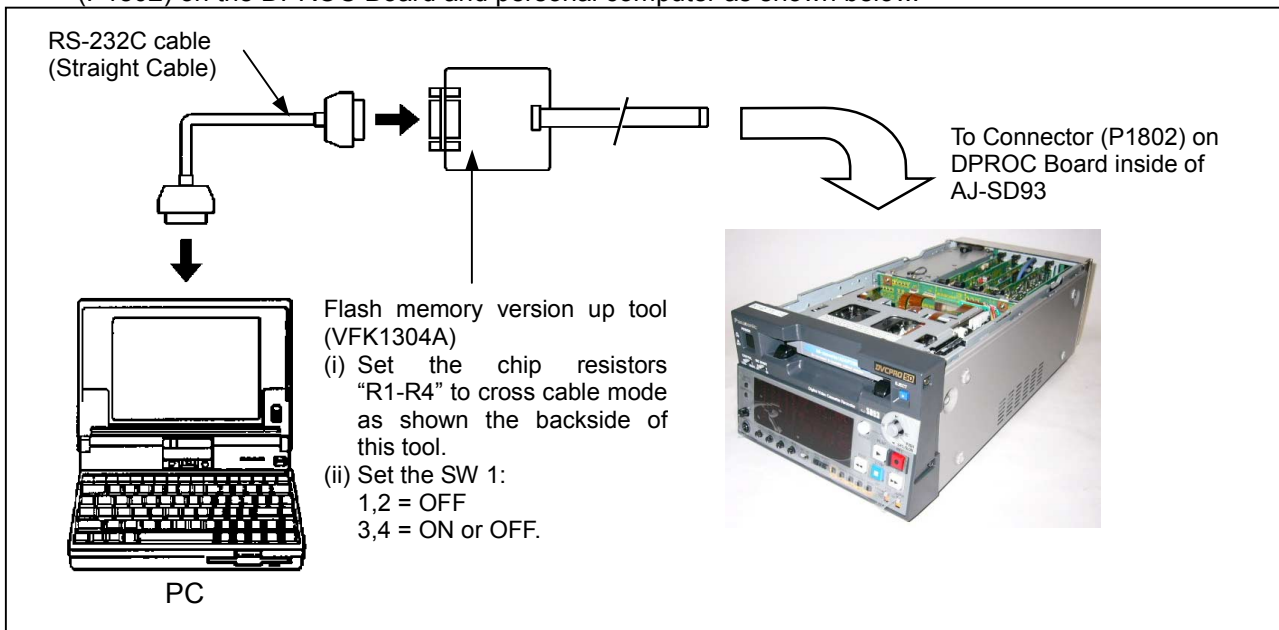
15-2. Writing UID

<Important Note>

The UID number should not be changed from the original one.

If the original UID number is needed, contact Panasonic Service Engineering.

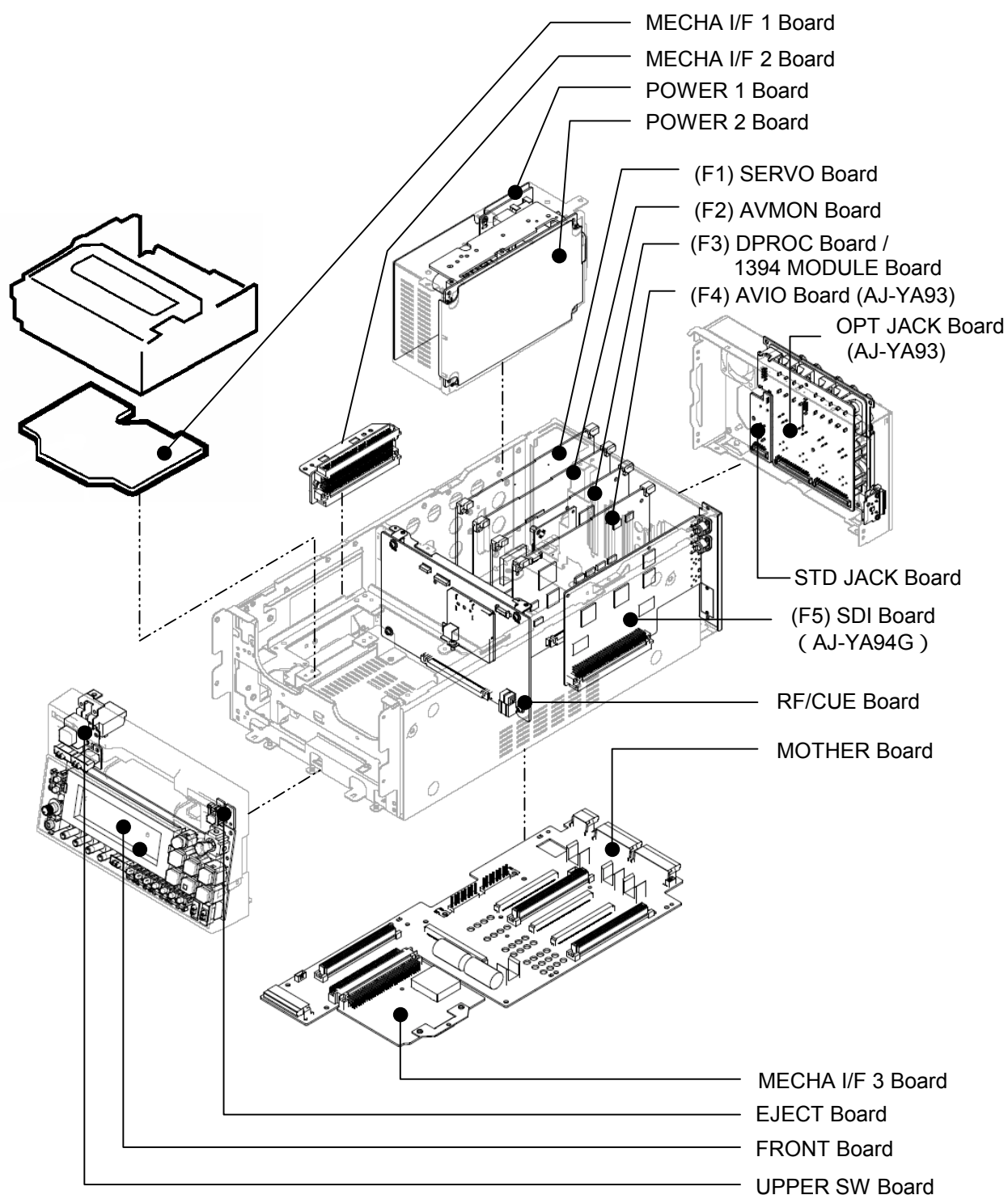
1. Connect the Flash memory version up tool (VFK1304A) and RS-232C Straight Cable between the connector (P1802) on the DPROC Board and personal computer as shown below.



2. Make sure that the direction of the flat cable connection (face side and reverse side of flat cable) to the tool (VFK1304A).
Set the flat cable to the connector as shown in the figures below.
Set the VFK1304A in the "CROSS CABLE" mode as shown the backside of the tool but the actual connection cable should be straight cable.
3. Set the DIP switch SW3301-1 to ON, and SW3301-2, 3 and 4 are "OFF".
4. Turn "ON" the personal computer power.

5. Start up the Hyper Terminal of Windows 95/98 on the personal computer.
(Programs of Windows → Accessories → Hyper Terminal → Hypertrm.exe)
Name the Hyper Terminal "1394", and select an icon.
Select the connection method. (Connecting using: Direct to COM*)
Perform settings of the Port. (Bits per second: 9600, Data bits: 8, Parity: None, Stop bits: 1, Flow control: None)
File → Properties → Settings → ASCII Setup → put a mark on the "Append line feeds to incoming line ends" of ASCII Receiving.
6. Turn "ON" the VTR power.
7. Input "uid" and then press the "Enter" key so that the current UID will be appeared.
The 8 digits of the first half are always 0084582.
The 8 digits of the last half are unique code.
8. Input "uid_write:enable" and press the "Enter" key, and make sure that the display shows "&OK".
9. Input "uid*****" and press the "Enter" key, and make sure that the display shows "&OK".
10. Input "uid_write:disable" and press the "Enter" key, and make sure that the display shows "&OK".
11. Input "uid" and press the "Enter" key, and make sure that the UID has been written.
12. Close the software "Hyper Terminal". Turn "OFF" the power of the VTR.

16. CIRCUIT BOARD LAYOUT DRAWING



SECTION 2

DISASSEMBLY PROCEDURES

CONTENTS

1. Disassembly Procedures	DIS-1
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1-5. Rear Panel Removal	DIS-2
1-6. MECHA IF 3 Board Removal	DIS-3
1-7. Power Supply Unit Removal	DIS-3
1-8. Power Supply Unit Disassembly	DIS-3
1-9. Mechanism Chassis Unit Removal	DIS-4

1. Disassembly Procedures

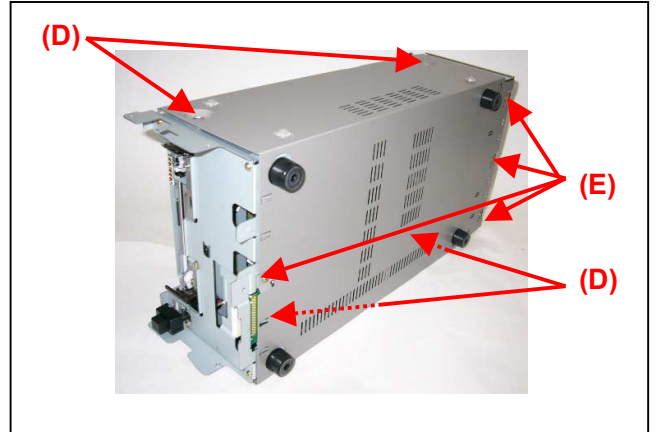
1-1. Top Panel Removal

1. Loosen the 2 screws (A) and remove the Top Case.



1-3. Bottom Case removal

1. Unscrew the 4 screws (D) and 4 screws (E).
2. Remove the Bottom Case.

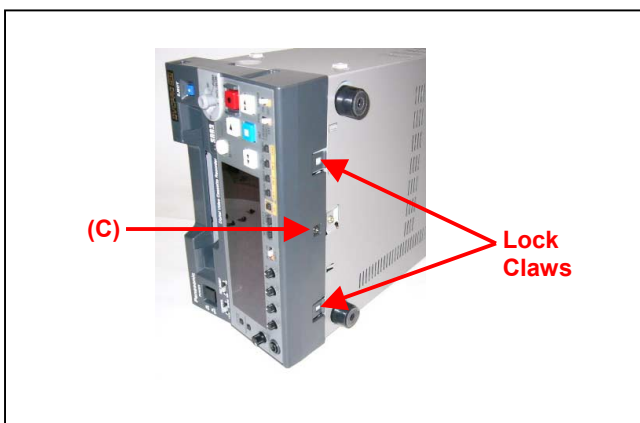


1-2. Front Panel Removal

1. Unscrew the 4 screws (B).

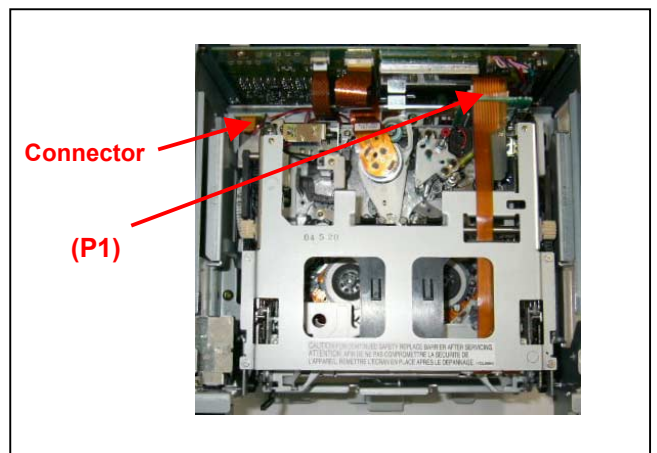


2. Unscrew the screw (C).
3. Release the lock claws and then remove the Front Panel Unit to the front.

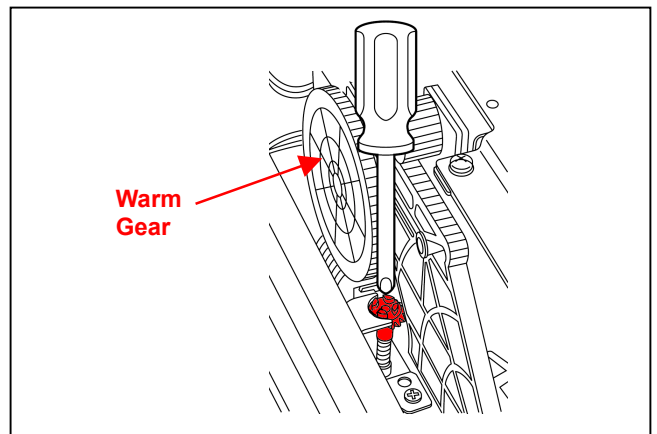


1-4. Front Loading Unit Removal

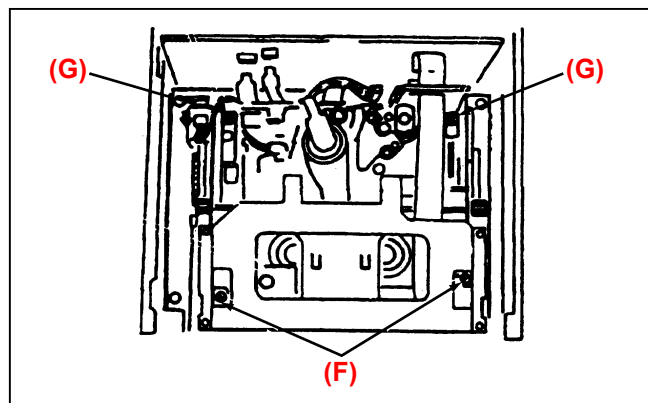
1. Disconnect the 2 connectors (To the Loading Motor and P1).



2. Push the red plastic screw in front of the worm gear of the cassette-down motor with a screwdriver and turn it counterclockwise to move the cassette holder to the position where the two screws (F) can be seen as shown the first figure of the next page.

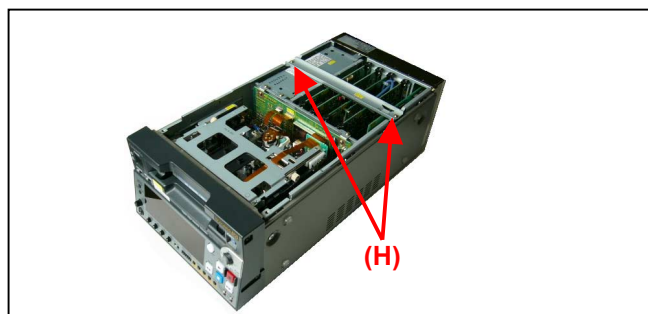


3. Unscrew the four screws (F) and (G), and then slowly lift up the Front Loading Unit.



1-5. Rear Panel Removal

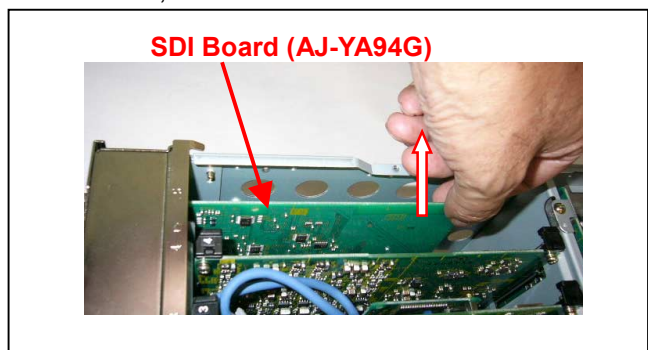
1. Unscrew the 2 screws (H) and remove the Boards support plate.



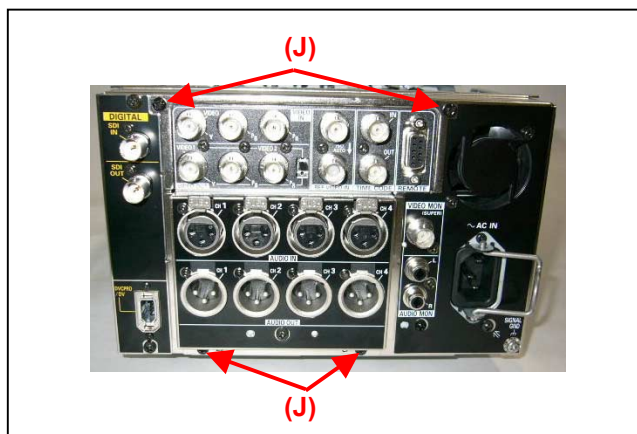
2. Unscrew the 4 screws (I).



3. When the Optional Board (SDI Board) AJ-YA94G is installed, remove the SDI Board as shown below.

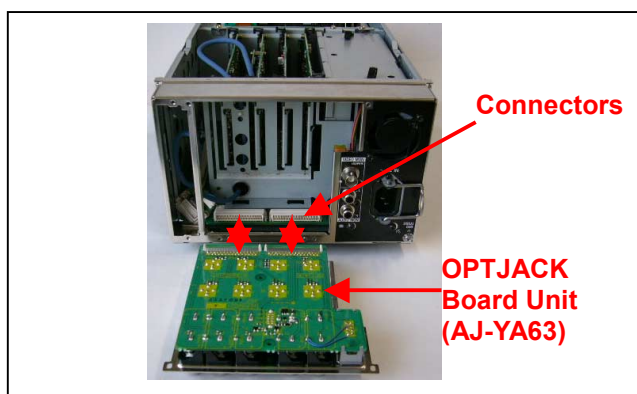


4. When the Optional Boards (IVIO Board and OPT JACK Unit) is installed, unscrew the 4 screws (J).

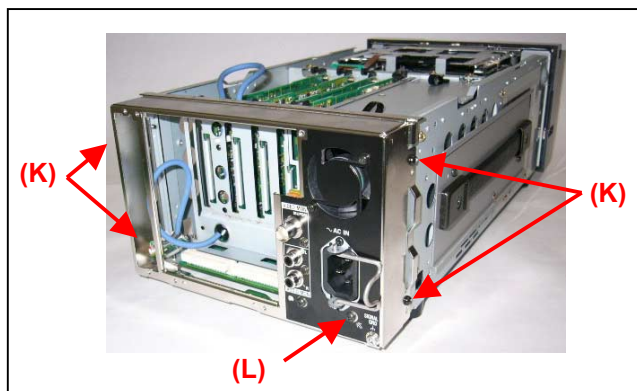


5. Pulling back the OPTJACK Board Unit and remove it.

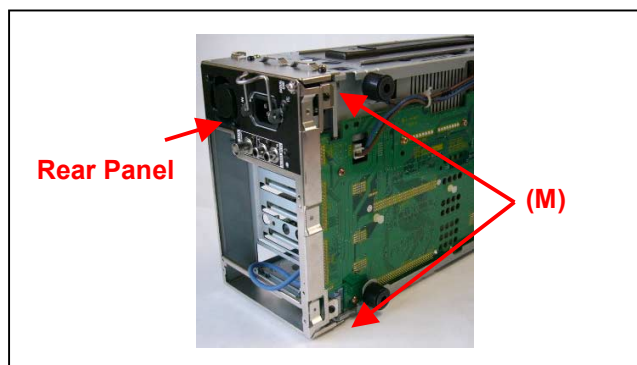
Note: The OPTJACK has been connected with the MOTHER board by connectors as shown below.



6. Unscrew the 5 screws (K) and (L)

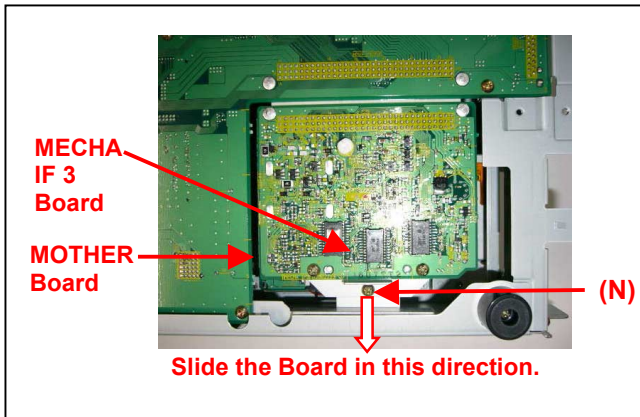


7. Unscrew the 2 screws (M) and remove the Rear Panel.



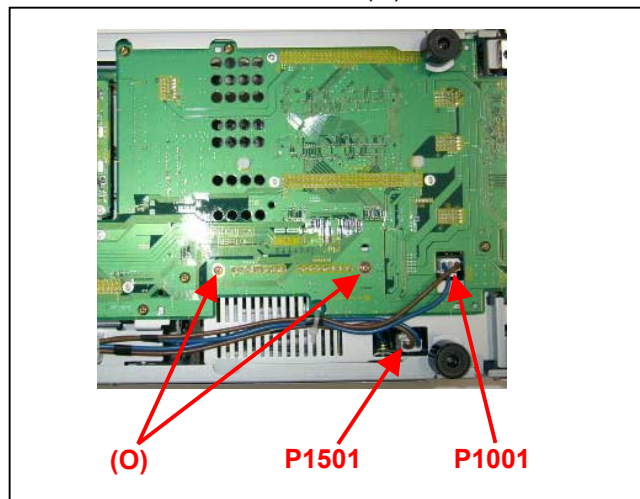
1-6. MECHA IF 3 Board Removal

1. Unscrew the screw (N).
2. Slide the MECHA IF 3 Board in the direction of the arrow and remove it..

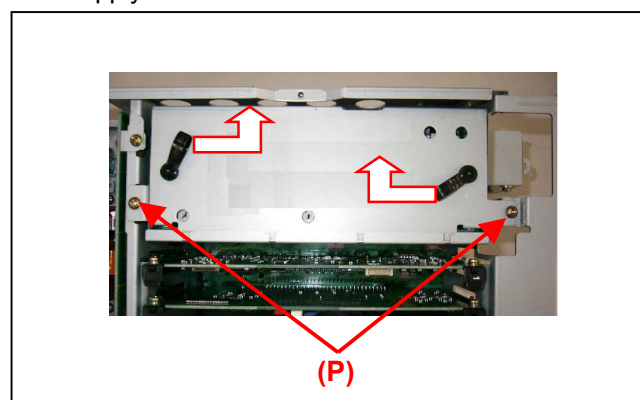


1-7. Power Supply Unit Removal

1. Disconnect the 2 connectors (P1501 and P1001) and unscrew the 2 screws (O).

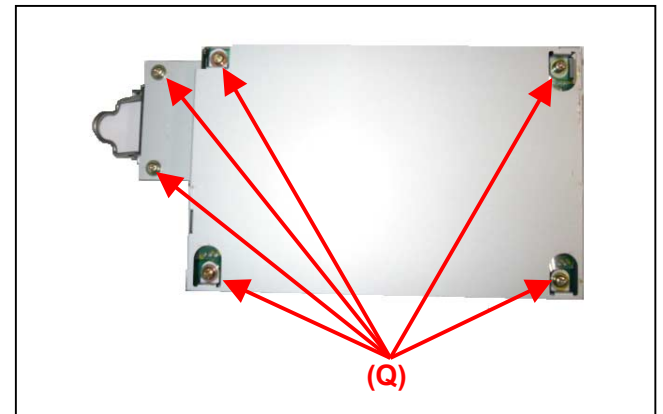


3. Unscrew the 2 screws (P) and lift up the Power Supply Unit.

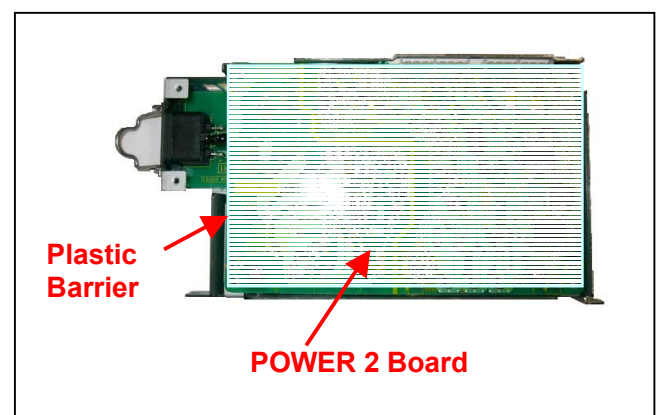


1-8. Power Supply Unit Disassembly

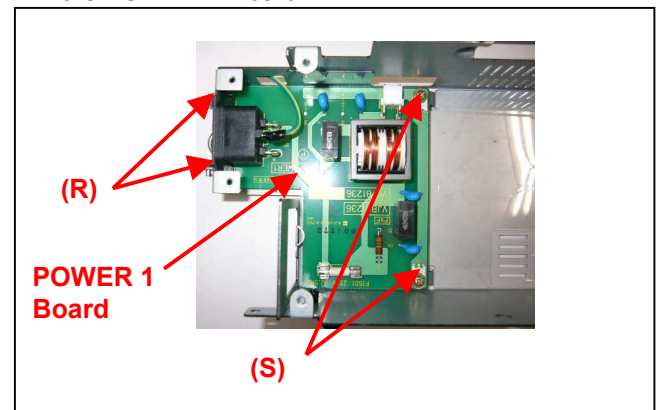
1. Unscrew the 6 screws (Q) and then remove the side cover.



2. Remove the Plastic Barrier and POWER 2 Board.

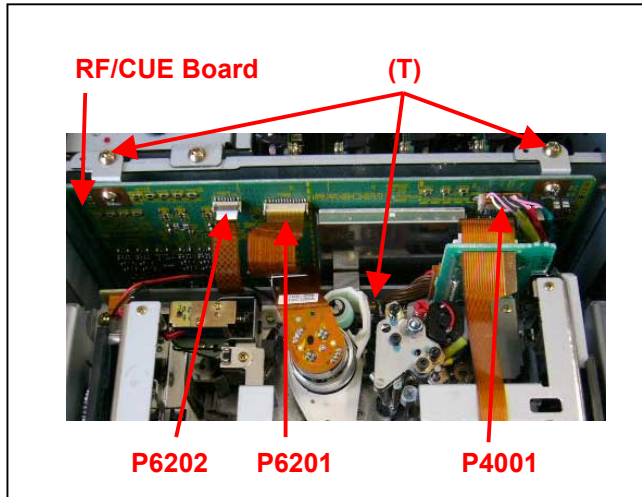


3. Unscrew the 4 screws (S) and (R), and then remove the POWER 1 Board.

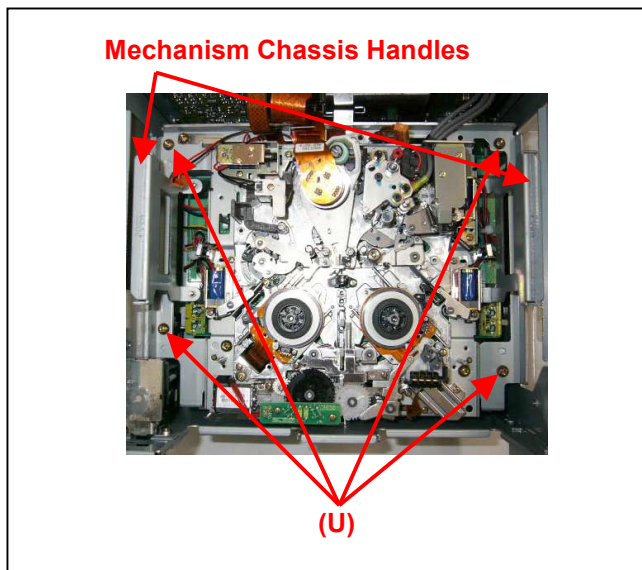


1-9. Mechanism Chassis Unit Removal

1. Disconnect the 3 connectors (P6202, P6201, and P4001).
2. Unscrew the 3 screws (T) and then temporary remove the RF/CUE Board.
3. Remove the Front Loading Unit according to the paragraph "1-4. Front Loading Unit Removal"



4. Unscrew the 4 screws (U) and lift up the handle on either side attached to the Mechanism Chassis.



SECTION 3

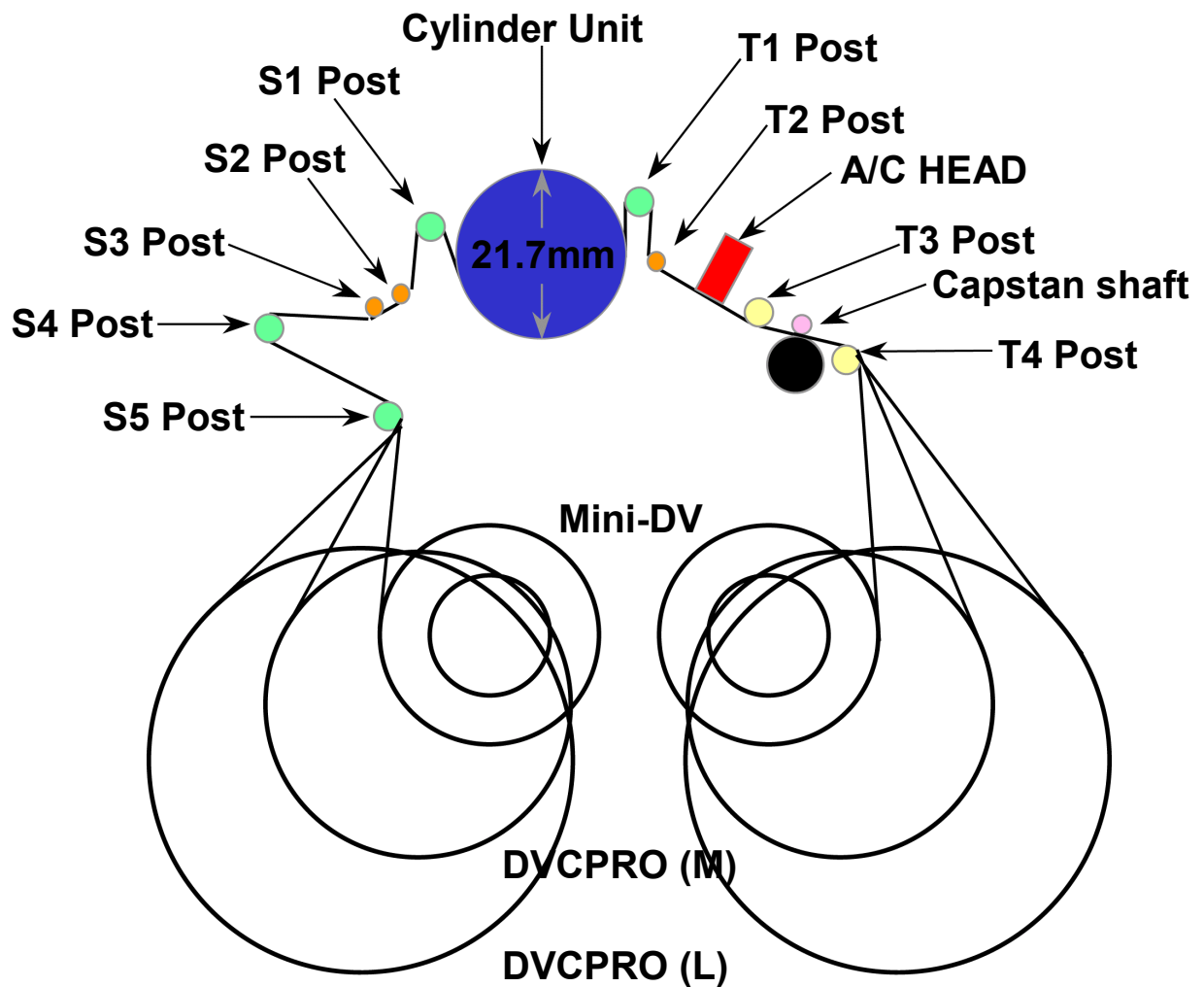
MECHANICAL ADJUSTMENT

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1. NAME OF TAPE TRANSPORTATION



- :VFK1149B (Post Driver)
● :VFK1151 (Nut Driver)

NAME	LIMIT
S1 Post	UPPER
S2 Post	FIXED
S3 Post	FIXED
S4 Post	LOWER
S5 Post	LOWER
T1 Post	UPPER
T2 Post	FIXED
T3 Post	LOWER
T4 Post	LOWER

2. TABLE OF TEST POINT

2-1. Table of Test Point, VR, Setting for Service Menu

<Table of Test Point, VR>

Name		TP & VR
[Tension Arm Adjustment]		
TENSION		SERVO (F) : TP201
TENSION OFFSET		MECHA I/F : VR1
TENSION GAIN		MECHA I/F : VR2
[Photo Sensor Voltage Adjustment]		
T-side Output		"A07 : T PHOTO" (SERVICE MENU)
T-side Adjustment Point		MECHA I/F : VR201
S-side Output		"A08: S PHOTO" (SERVICE MENU)
S-side Adjustment Point		MECHA I/F : VR202
[Tape Path, A/C Head Adjustment]		
ENV-PB-L		RF/CUE : TP6302
ENV-RP-L		(The selection can be made by the service menu.)
ENV-PB-R		RF/CUE : TP6502
ENV-RP-R		(The selection can be made by the service menu.)
HSW-RP-L		SERVO : TP233
LIVE-CTL		SERVO : TP30
FP (FRAME PULSE)		SERVO : TP301
CUE		RF/CUE : TP4102
[LISTA Adjustment]		
R/P-L-ATF ERR		RF/CUE : TP6701
PB-L-ATF ERR		(The selection can be made by the service menu.)
R/P-R-ATF ERR		RF/CUE : TP6801
TRG	R/P-L-HSW	SERVO : TP233
	PB-L-HSW	SERVO : TP232
	R/P-R-HSW	SERVO : TP235

<A/C Head Adjustment Mode>

Adjustment Name	Adjustment mode (SERVICE MENU)	
Azimuth, X Value Adj.	A15: RPL LIN 25	A13: RPL LIN 50
X Value Compensation	A11: X VALUE 25	A10: X VALUE 50
Envelope Waveform Confirmation	A19:TRK VAL 50RP	A20:TRK VAL 50PB
	A21:TRK VAL 25RP	A22:TRK VAL 25PB

<LISTA Adjustment Mode>

Adjustment Name	Adjustment Mode		
	SERVICE MENU		TPG
Sensitivity ADJ R/P	A14: RPL GAIN 25	A12: RPL GAIN 50	R/P-L-HSW
Linearity ADJ	A15: RPL LIN 25	A13: RPL LIN 50	
Sensitivity ADJ PB	A17: PBL GAIN 25	A16: PBL GAIN 50	PB-L-HSW
Sensitivity ADJ DV	A18: RPR GAIN DV		R/P-R-HSW

3. MECHANICAL ADJUSTMENT PROCEDURES

3-1. Post Height Pre-adjustment

MODE	EJECT (POWER OFF)
TOOL	VFK1149B (Post Driver) VFK1151 (2.5mm Nut Driver) VFK1154 (Post Height Fixture) VFK1153 or VFK1586 (Mech. Neutral Plate)

1. Set the VTR to Loading condition (refer to NO TAPE LOADING METHOD in MECH-39)
2. Confirm that the Reel Table is located at M-Cassette position.
3. Install the Mech. Neutral Plate and adjust each post height to lower limit as following figure.
4. Please refer to following table about Post Driver to be used to adjust each post.

Post	Post Driver
S4 & S5 Post	VFK1149B
T3 & T4 Post	VFK1151

Post	Limit
S4 & S5 Post	Lower Limit + $0.2 \pm 0.05\text{mm}$ (Turn 1 round more counterclockwise from lower limit position.)
T3 & T4 Post	Lower Limit

3-2. Tension Arm Adjustment Flowchart

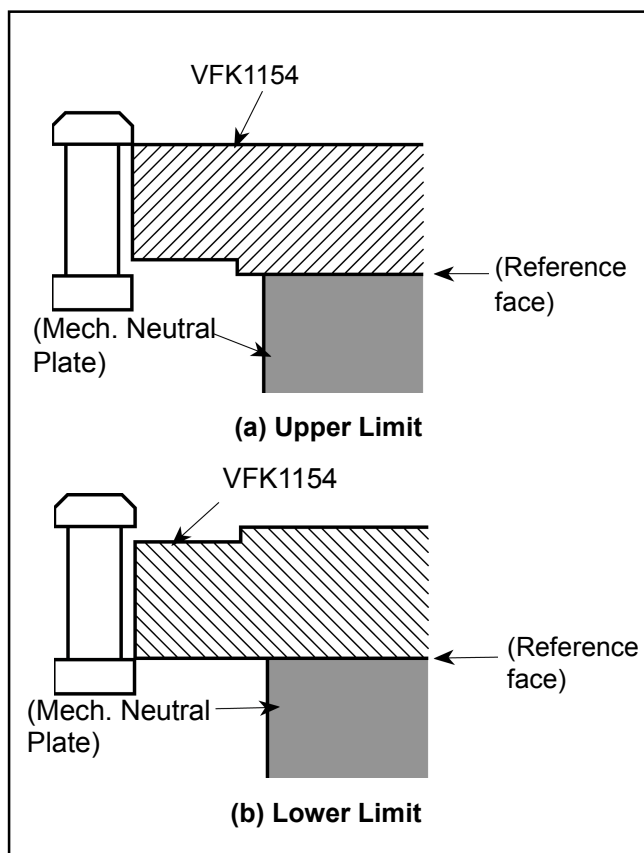


Figure 3-1-1

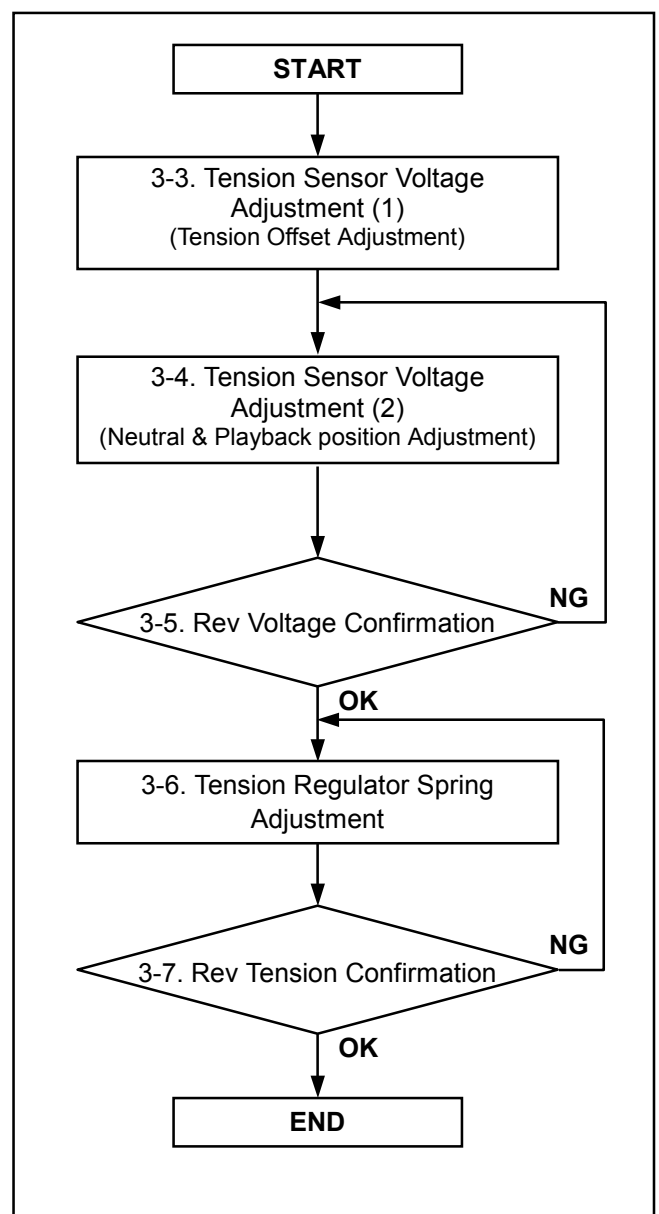


Figure 3-2-1

3-3. Tension Sensor Voltage Adjustment (1)

SPEC.	2.5V \pm 0.05V
TEST POINT	TP201 (SERVO)
ADJ.	VR1 (OFFSET) on the Mech. I/F board
MODE	EJECT
TOOL	Digital voltmeter

1. Connect the Digital voltmeter to TP201.
2. Adjust the VR1 on the Mech. I/F board so that the DC voltage is in the specification.

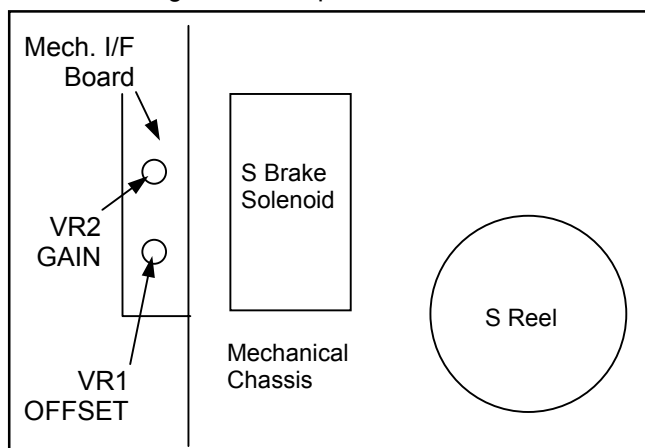


Figure 3-3-1

3-4. Tension Sensor Voltage Adjustment (2)

SPEC.	Neutral position : 2.5V \pm 0.1V PLAY position : 3.8V \pm 0.05V
TEST POINT	TP201 (SERVO)
ADJ.	Sensor Position, VR2 (GAIN)
MODE	EJECT
TOOL	Digital voltmeter, VFK1208 (Neutral Position Tool, Black with hole) VFK1156 (PLAY Position Tool, Black)

NOTE:

Do not use magnetized tweezers and screwdriver.
Do not touch the magnetize screwdriver to S-Reel FG magnet portion, while adjusting the lever (D) portion.

<Preparation>

1. Disconnect the connector P3 on the Carriage Board of the Front Loading Unit.
2. Unscrew the 6 screws and remove the Top Plate on the Front Loading Unit as shown in figure 3-4-1.
3. Connect the Flexible cable to P3 on the Carriage Board of Front Loading Unit.

<Adjustment Procedure>

1. Open the SERVICE MENU.
2. Select the **A00: SERVO ADJUST** and press the "SET" button to open the SERVO ADJUST MENU.
3. Select the **A09 TENSION**.
4. Install the VFK1208 (black with hole) as shown in figure.
5. Connect the Digital voltmeter to TP201.
6. Rotate JOG dial clockwise pushing Search button so that the mechanism shift to Loading mode. ("on" mark is displayed on **A09 : TENSION**)
7. Confirm the DC voltage at TP201 is 2.5V \pm 0.1V (Neutral position). If it is not, adjust the sensor position as follows.
Loosen the screw (A) and move the lever (D) with tweezers. After adjusting, rotate JOG dial counter clockwise pushing Search button to set the unloading position.
8. Remove the VFK1208 (black with hole), and install the VFK1156 (Black) as same way as VFK1208.
9. Rotate JOG dial clockwise pushing Search button so that the mechanism shift to Loading mode. ("on" mark is displayed on **A09 : TENSION**)
10. Adjust the VR2 (GAIN) on the Mech. I/F board so that the DC voltage at TP201 is 3.8V \pm 0.05V (PLAY position).

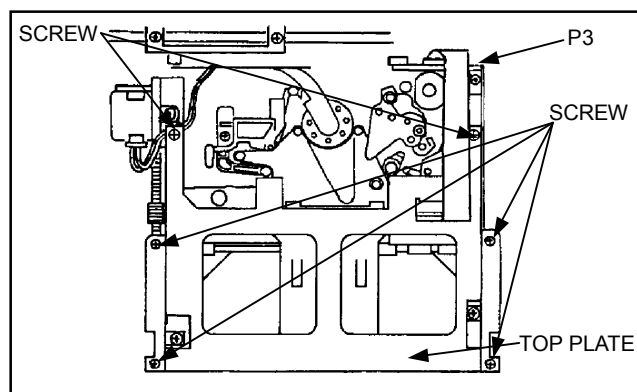


Figure 3-4-1

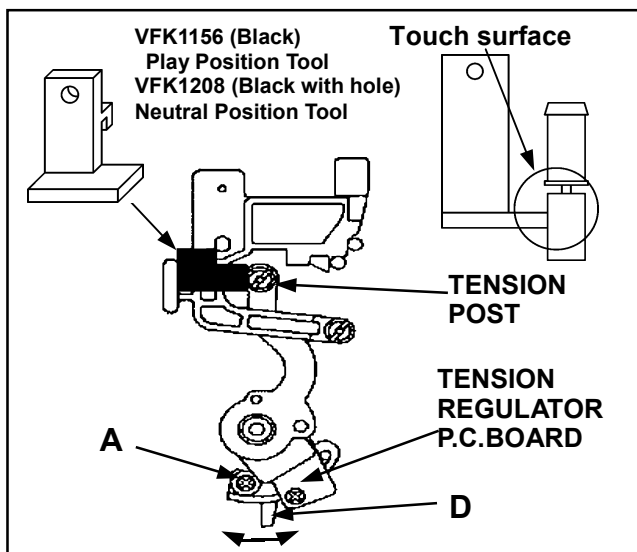


Figure 3-4-2

3-5. Tension Arm PLAY and REV Voltage Confirmation

SPEC	PLAY : $3.8 \text{ V} \pm 0.05 \text{ V}$ REV : $1.2 \text{ V} \pm 0.3 \text{ V}$
TEST POINT	TP201 (SERVO)
ADJ.	-----
MODE	PLAY, SHTL (REV)
TOOL	Digital Volt Meter

1. Insert the cassette tape (any cassette except thin type of tape) and confirm that the voltage at TP201 in each mode is in SPEC.
2. If it is out of the specification even though item 3-3) – 3-4) is in the specification. Servo P.C.B. or Mecha I/F P.C.B. might be faulty.

3-6. Tension Regulator Spring Adjustment

SPEC	$110 \pm 10 \text{ mN-m}$ ($11 \pm 1 \text{ gf}$)
TEST POINT	TP201 (SERVO)
ADJ.	Tension Regulator Spring hook (B)
MODE	STOP
TOOL	VFK1188A (Dial Tension Gauge) Digital Volt Meter

<Preparation>

1. Loosen the 2 screws and remove the Carriage Support Panel on the Front Loading Unit.
2. Disconnect the connector P3 on the Carriage Board of the Front Loading Unit.
3. Unscrew the 6 screws and remove the Top Plate on the Front Loading Unit as shown in figure 3-4-1.
4. Connect the Flexible cable to P3 on the Carriage Board of Front Loading Unit.

<Adjustment Procedure>

1. Open the SERVICE MENU and Select the A00 : SERVO ADJUST and press the "SET" button to open the SERVO ADJUST MENU.
2. Select the A09 TENSION.
3. Rotate JOG dial clockwise pushing Search button so that the mechanism shift to Loading mode. ("on" mark is displayed on A09 : TENSION)
4. Push the tension post to the direction R by the tension gauge as shown in Figure 3-6-1 until the voltage at the test point becomes 3.8V (It means PLAY position). And then confirm the indication (tension) of gauge is in SPEC.
5. If it is out of SPEC, loosen the screw (C) and adjust the position of hook (B) so that the indication (tension) of gauge is within the specification. Then tighten the screw (C) and reconfirm tension is within the specification.

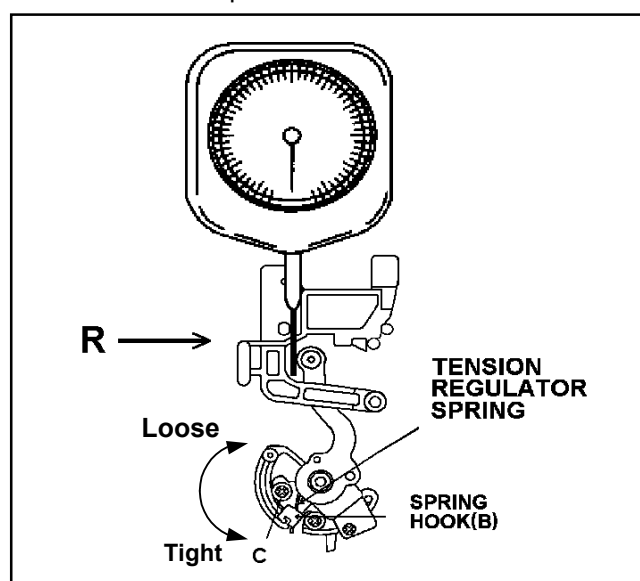


Figure 3-6-1

3-7. REV Tension Confirmation

SPEC	180mN \pm 20mN (18gf \pm 2gf)
TEST POINT	TP201 (SERVO)
MODE	STOP
TOOL	VFK1188A (Dial Tension Gauge) Digital Volt Meter

<Preparation>

1. Loosen the 2 screws and remove the Carriage Support Panel on the Front Loading Unit.
2. Disconnect the connector P3 on the Carriage Board of the Front Loading Unit.
3. Unscrew the 6 screws and remove the Top Plate on the Front Loading Unit as shown in figure 3-4-1.
4. Connect the Flexible cable to P3 on the Carriage Board of Front Loading Unit.

<Confirmation Procedure>

1. Open the SERVICE MENU and Select the A00 : SERVO ADJUST and press the "SET" button to open the SERVO ADJUST MENU.
2. Select the A09 TENSION.
3. Rotate JOG dial clockwise pushing Search button so that the mechanism shift to Loading mode. ("on" mark is displayed on A09 : TENSION)
4. Push the tension post to the direction R by the tension gauge as shown in Figure 3-7-1 until the voltage at the test point becomes 1.2V (It means REV position).
5. Confirm that the indication (tension) of gauge is within the specification. If not, perform the Tension Spring Adjustment again.
6. After finishing this adjustment, glue the screw (A), (B) and (C). The glue quantity at (B) is half of (A) and (C).
Glue the screw (A) and (C) should be as big as a grain of rice. For the screw (B), it should be half of that.

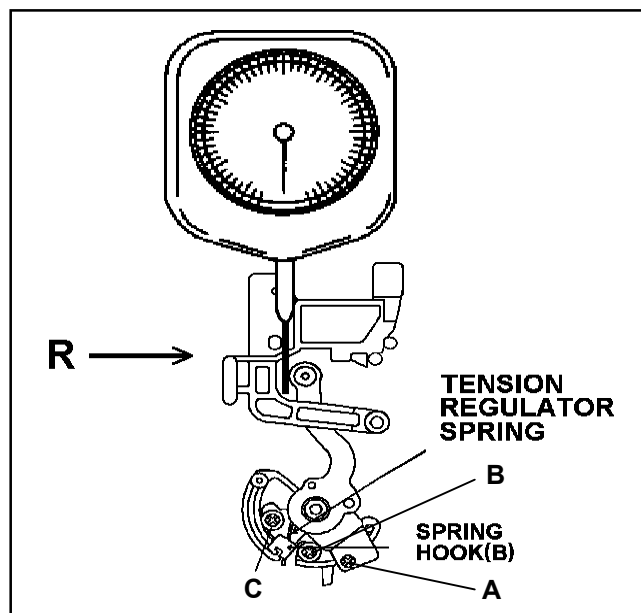


Figure 3-7-1

3-8. Tension Confirmation

SPEC	PLAY : 0.06N \pm 0.01N (6gf \pm 1gf) REV : 0.09N \pm 0.02N (9gf \pm 2gf)
MODE	PLAY, REV \times 1
TAPE	63 min M size blank tape
TOOL	VFK1145A (Tension Meter)

- ◆ Please calibrate Tension Meter before tension measurement by the following procedure.

<Calibration of Tension Meter>

1. Attach the 7 grams calibration plumb to DVCPRO tape. (It's tape and plumb are included in VFK1145A.)
2. Set the above tape to the Tension Meter as shown in figure 3-8-1.
3. Pull up the tape by the speed of 33mm/sec and adjust the Tension Meter so that the meter shows 7 grams (0.07N).

- ◆ To calibrate Tension Meter, the tape must be inserted into the posts of Tension Meter as shown in figure 3-8-1.

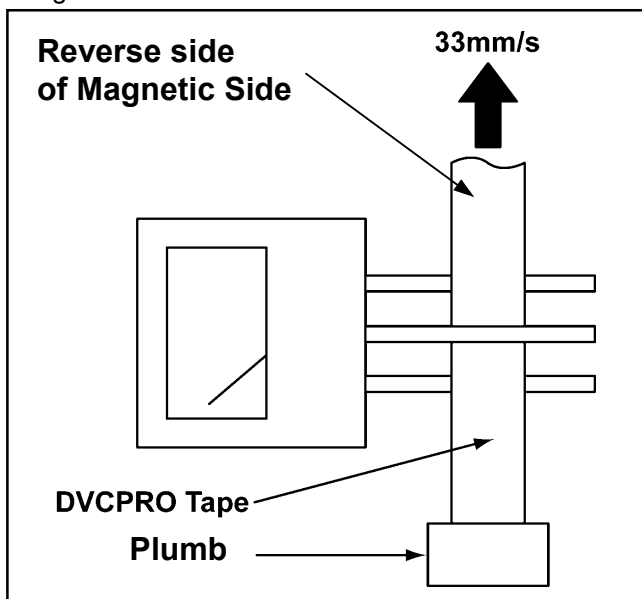


Figure 3-8-1

1. Play back the beginning portion of the tape.
2. Insert the tension meter between S3 post and S4 post as shown in figure 3-8-2.
3. Confirm that the tension value is within the specification.

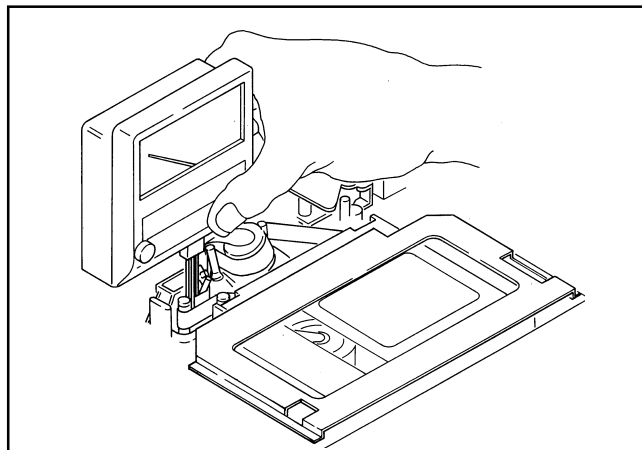


Figure 3-8-2

4. Place the unit in REV \times 1 mode.
5. Insert the tension meter between S4 post and S5 post as shown in figure 3-8-3. (Direction is reverse)
6. Confirm that the tension value is within the specification. (Read the meter from rear side as shown in figure 3-8-3.)
7. If it is out of specification, please perform the Tension Arm Adjustment.

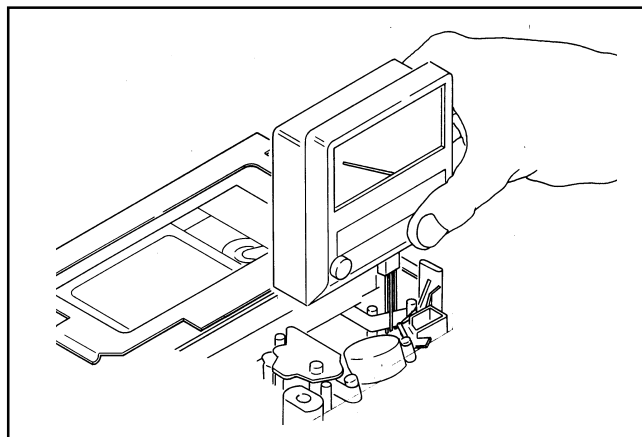


Figure 3-8-3

NOTE :
Pay attention not to give some tape damage.

3-9. Photo Sensor Voltage Adjustment

SPEC	2.2 ± 0.6 (V DC)
TEST POINT	<SERVICE-MENU : SERVO> The voltage is displayed on the Service menu. A07 : T PHOTO A08 : S PHOTO
ADJ.	T PHOTO VR201 (MECHA I/F) S PHOTO VR202 (MECHA I/F)
MODE	STOP
TAPE	VFK1423 (Tape Beg./End M Cassette)
M. EQ	Oscilloscope

<Classified list of specification>

1. Open the "Service Menu: Servo" and move the cursor (*) to "A07: T PHOTO".
2. Insert the VFK1423 and check the voltage which is shown on the menu.
3. Adjust VR201 to meet the specification of T side photo Sensor Voltage.
4. Move the cursor (*) to "A08: S PHOTO" and check the voltage which is shown on the menu.
5. Adjust VR202 to meet the specification of S side photo Sensor Voltage.

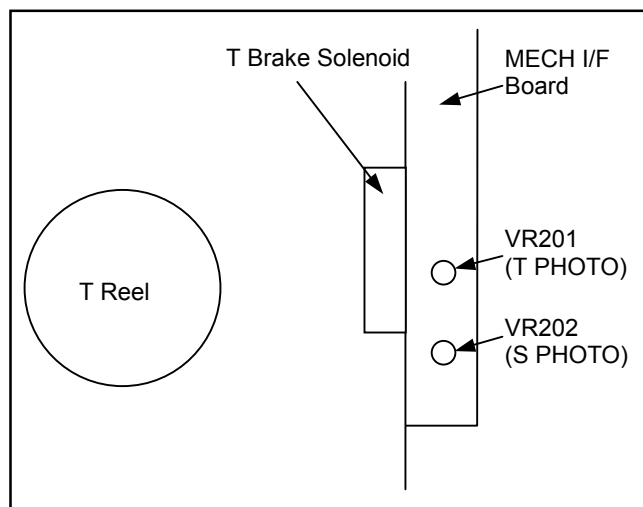
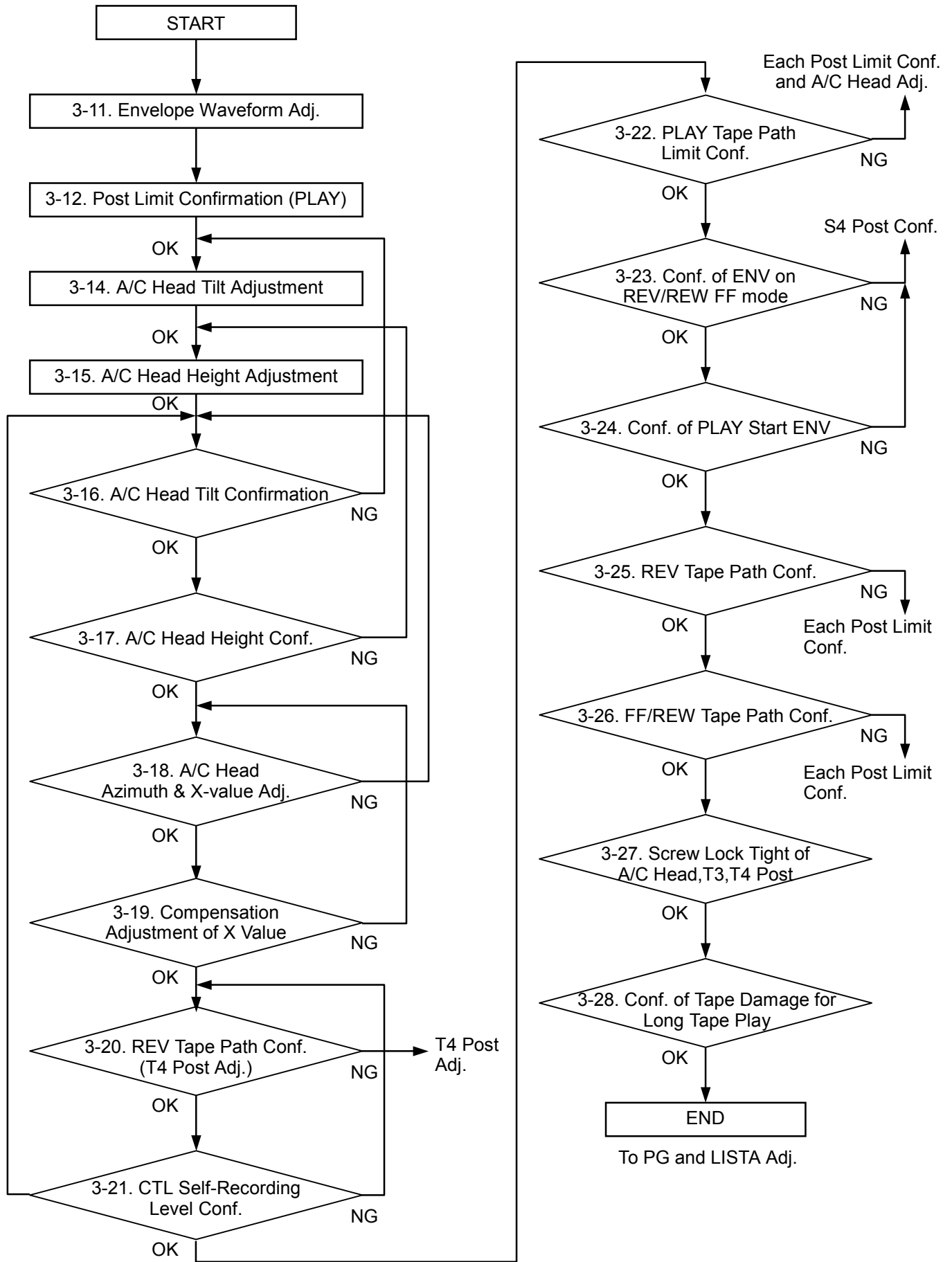


Figure 3-9-1

3-10. Tape Path Adjustment Procedure



3-11. Envelope Waveform Adjustment

SPEC	$V1/V_{max}, V2/V_{max}, V3/V_{max} \geq 0.8$
TEST POINT	TP6302 (RF/ CUE)
ADJ.	S1, T1 Post Height
MODE	PLAY (ATF)
TAPE	NTSC : VFM3580KM or VFM3580KL (PAL : VFM3680KM or VFM3680KL)
M.EQ	Oscilloscope
TOOL	VFK1149 or VFK1149B (Post Driver)

<Adjustment Procedure>

1. Playback the alignment tape with DVCPRO25 mode.
2. Adjust S1 and T1 post height so that the envelope signal is within the specification.
3. To adjust the S1 or T1 posts, at first raise the post height. Then the envelope at the entrance or exit side becomes small. Then down the post height until envelope becomes flat.
4. As the order of adjustment, adjust T1 post to make it flat at exit side of envelope first and then adjust S1 post.
5. After finishing this adjustment, unload the tape and load the tape again, then confirm the shape of Envelope waveform does not change.

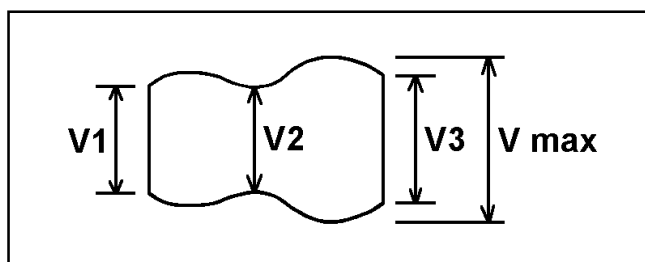


Figure 3-11-1

3-12. Post Limit Confirmation (PLAY)

SPEC	Post limit is shown in the following table. Curl should not appear on tape edge
MODE	PLAY
TAPE	Blank tape
TOOL	VFK1149 or VFK1149B (Post Driver) VFK1151 (Nut Driver)

1. Confirm that the tape path limit meets the specification in the following table. If not, adjust it.
2. Confirm that the tape path is not the condition of D, E and F as shown in figure 3-12-1.

Post	Limit	Adjustment Method
S5	Lower limit or Free	Refer to Post Height Pre-Adj.
S4	Lower Limit	
S1	Upper Limit	Envelope waveform Adj.
T1	Upper Limit	
T3	Lower Limit	Post Height Pre-Adj.
T4	Upper, Free or Lower limit	

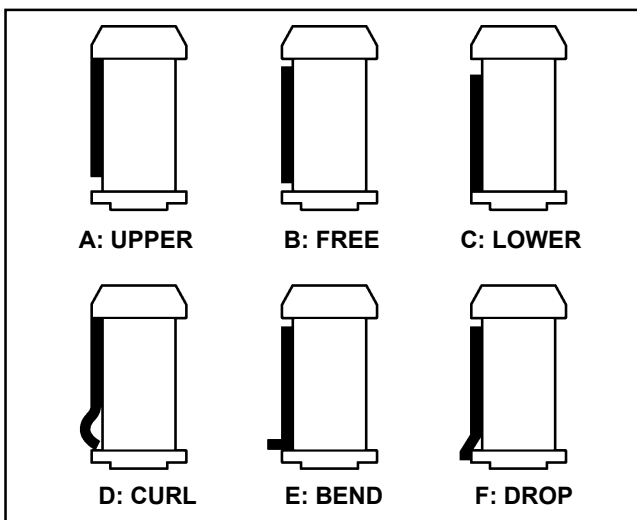


Figure 3-12-1

3-13. A/C Head Adjustment Method (General)

Adjustment item	SCREW	Adjustment Method	Torque
Tilt adjustment	A	①. Adjust screw A after loosening screw G. Tightened direction : Decrease Cue level Loosened direction : Increase Cue level ②. Tighten screw G after finishing the adjustment of screw A. (refer to following item "Azimuth adjustment & fix")	None
Azimuth adjustment	F	①. Phase is adjusted by screw F after loosening screw G ②. Tighten screw G after finishing the adjustment of screw F. (refer to below item "Azimuth & Tilt")	None
Fixing Azimuth & Tilt	G	Screw (G) must be always tightened during the adjustment except Tilt and Azimuth Adjustment.	10cN·m (1Kgf·cm)
Height adjustment	B	Tightened direction : In case CTL level increase when A/C Head Press down. Loosened direction : In case CTL level increase when A/C Head lift up NOTE : Please refer to figure 3-13-4 for the portion to lift up and press down A/C Head.	None
Fixing height	H	After height adjustment, tighten the screw (H) to fix height of A/C Head. Normally the CUE level is decreased when the screw (H) is tightened. Adjust screw (B) considering it.	19.6cN·m (2.0Kgf·cm)
X-value adjustment	C, D	①. Adjust X-value at Hole (E) by VFK0357, then tighten the screw (C) and (D) to fix A/C Head horizontal position. ②. Hit gently at the portion of A/C Head Top Plate as shown in figure 3-13-5 to confirm the phase shift.	24.6cN·m (2.5Kgf·cm)

SCREW	Tool for adjustment
A	VFK1178A (0.89mm Hex Driver)
B	VFK1150A (5.5mm Nut Driver)
F	VFK1148A (1.5mm Hex Driver)
C, D, G	VFK1209A (Torque Driver), VFK1148A (1.5mm Hex Driver) VFK0912 or 1375 (1.5mm Post Axis Driver)
H	VFK1190 (1.5mm L type of Hex Wrench)

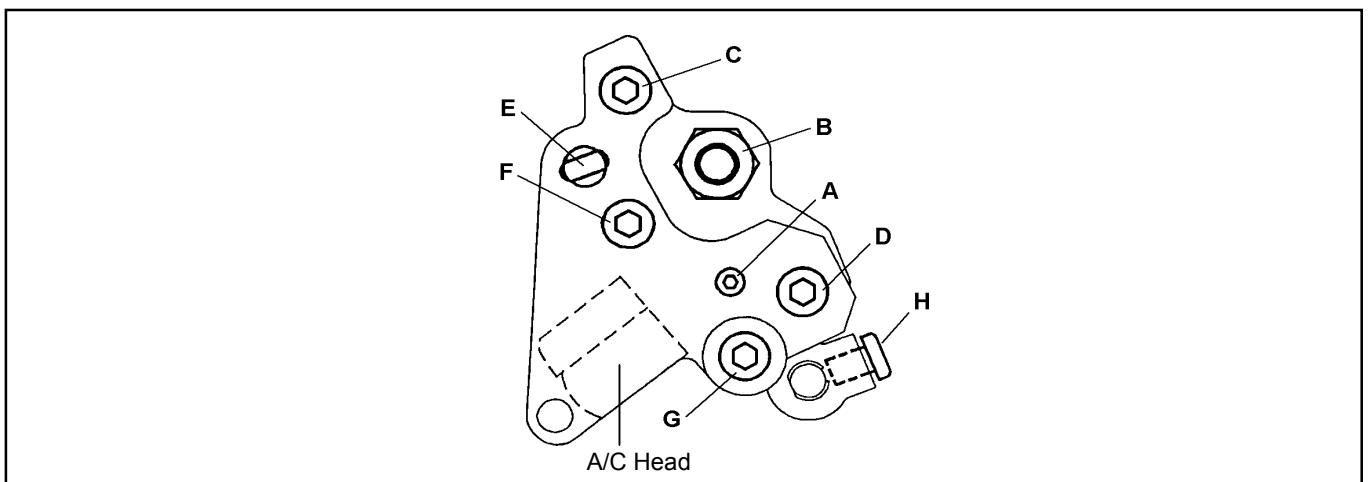


Figure 3-13-1

1. For Tilt and Azimuth adjustment, loosen the screw (G) first and tighten the screw (G) after finish adjustment. And if need to turn the screw (A) and (F) too much for adjustment, tighten screw (A), (F) and (G) alternately.

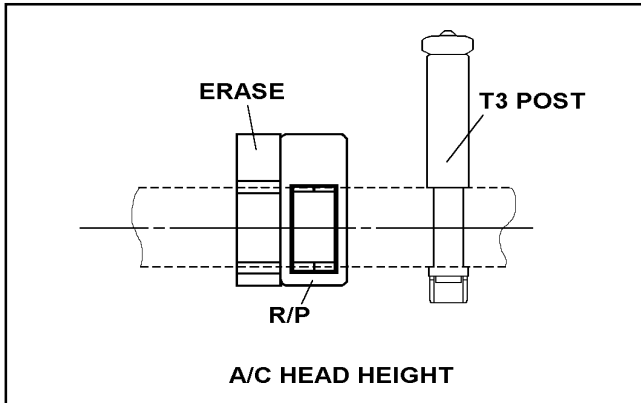


Figure 3-13-2

2. Perform the Height and X-value adjustment under the screw (G) tightened completely.
3. Be careful the tape damage at T3 Post, when adjust tilt of A/C Head. (refer to figure 3-13-2)

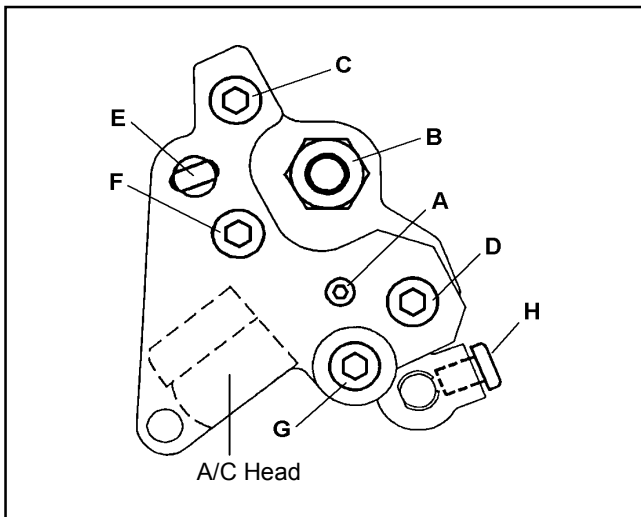


Figure 3-13-3

4. Confirm the screw (A) isn't loose, before perform A/C Head Tilt adjustment. The screw (A) should be always touch to top of A/C Head.
5. When the height of A/C Head is adjusted by the Nut (B), the screw (H) should be loosen first. And after height adjustment finished, tighten the screw (H) lightly.

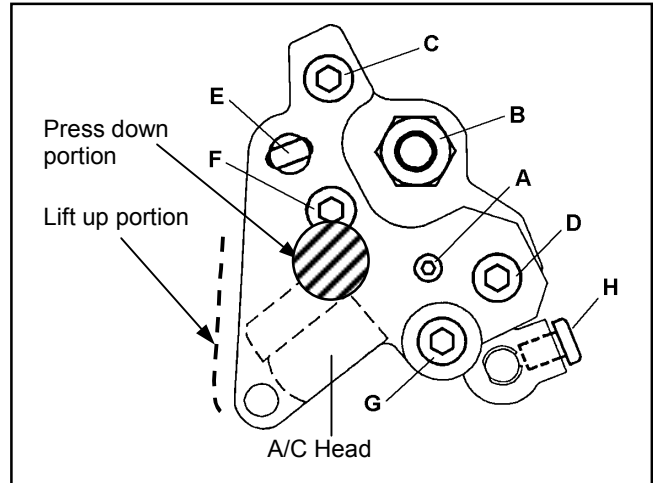


Figure 3-13-4

6. After finish X value adjustment, hit the portion (L) lightly and confirm the specification of X-value.
7. Each adjustment of A/C Head should be finished at the condition of tightening the each adjustment screw. And hit the portion (L) lightly to release the distortion of A/C Head plate.

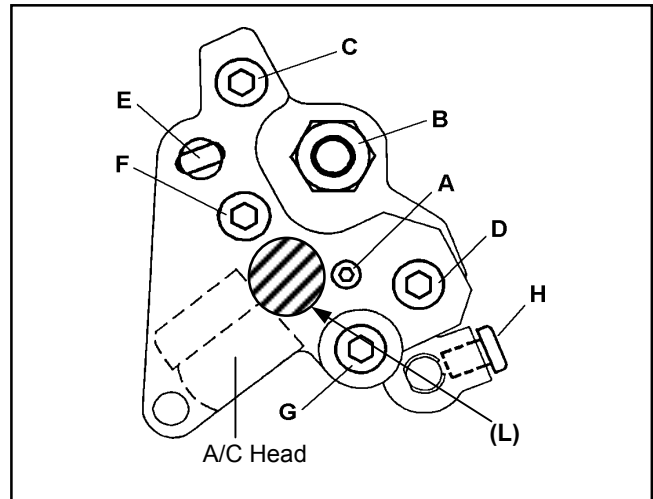


Figure 3-13-5

3-14. A/C Head Tilt Adjustment

SPEC	Curl should not appear on tape edge. Lower limit at T3 post
ADJ.	SCREW A, G (A/C Head)
MODE	PLAY
TAPE	Blank tape
TOOL	VFK1148A, VFK1178A (Hex Driver)

1. Play back the tape and adjust the screw (A) for adjustment of A/C Head tilt so that the tape path meets the above specification.
2. For adjustment, loosen the screw (G) and make curl on tape at lower flange of T3 post by loosening screw (A). And tighten the screw (A) to raise the tape and fix it at the point where the curl just disappear.
3. Tighten the Screw (G) with 10cN·m (1kgf·cm) torque after finishing the adjustment for Screw (A).

NOTE :

1. In case of turning the screw (A) clockwise.
→ Tape goes up at T3 post.
In case of turning the screw (A) counter-clockwise.
→ Tape goes down at T3 post.
2. The screw (A) adjustment should be finished in tightening direction. And confirm that the screw (A) isn't loose.
3. The Adjustment of Tilt, Azimuth and Height influence each other. Hence those adjustment should be performed alternately.

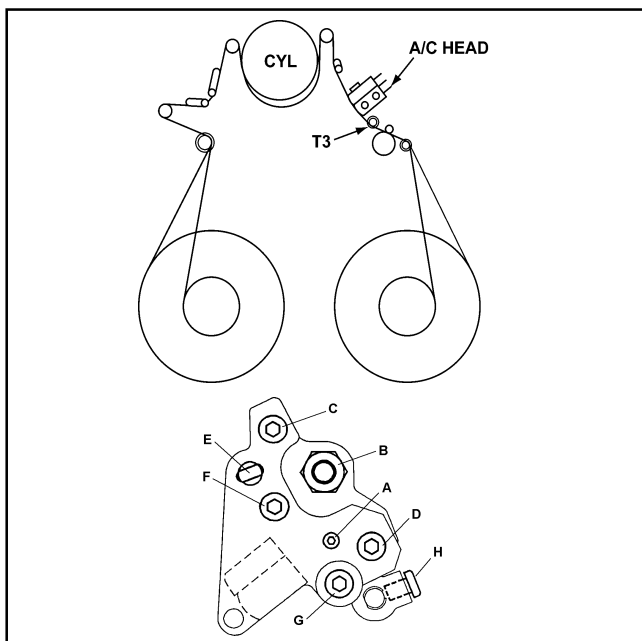


Figure 3-14-1

3-15. A/C Head Height Adjustment

SPEC	CUE : A=A max CTL : C1, C2 ≥ 1.8V
TEST POINT	CUE AUDIO : TP4102 (RF/CUE) CTL : TP30 (SERVO)
ADJ.	SCREW B, H (A/C Head)
MODE	25M mode PLAY
TAPE	NTSC : VFM3580KM or VFM3580KL (14 to 22min) PAL : VFM3680KM or VFM3680KL (14 to 22min)
TOOL	VFK1150 (Nut Driver) VFK1190 (Hex Wrench)

1. Press and Lift up A/C Head lightly (refer to figure 3-13-4), then confirm that the CTL and CUE output level is within the specification.
2. If it is out of spec., loosen the screw H and adjust the screw B until Cue output is maximized.
3. Confirmation of the level has to be done after the screw (H) is tighten completely. (refer to A/C Head Adjustment Method)
4. A/C head height adjustment should be done with Azimuth and X Value adjustment alternately.

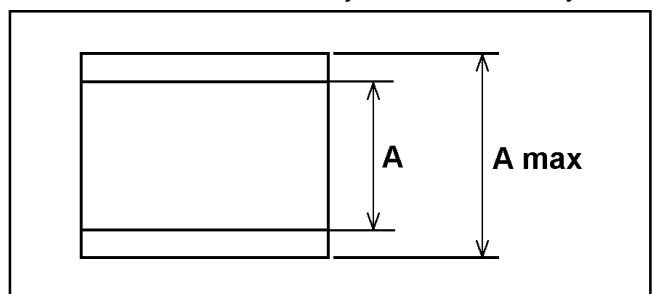


Figure 3-15-1

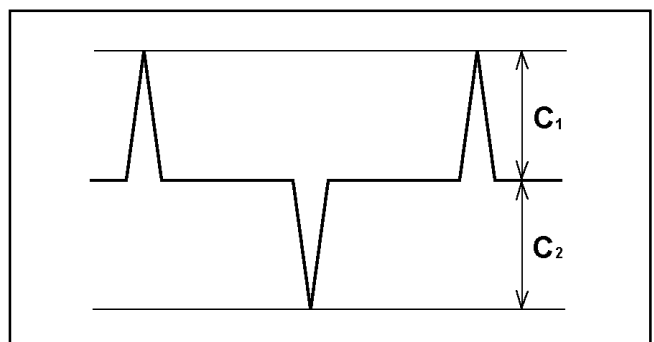


Figure 3-15-2

3-16. A/C Head Tilt Confirmation

SPEC	$A/A_{max} \geq 0.8$
TEST POINT	CUE AUDIO : TP4102 (RF/CUE)
ADJ.	SCREW A, G (A/C Head)
MODE	PLAY
TAPE	NTSC : VFM3580KM or VFM3580KL (14 to 22min) [PAL : VFM3680KM or VFM3680KL] (14 to 22min)
TOOL	VFK1178A, VFK1148A (Hex Driver)

1. Playback the Alignment tape.
2. Confirm that the screw (G) and (H) are not loose.
3. Push the tension post to the arrow (B) direction as shown in following figure without moving T2 post. And confirm that the CUE output level is within the specification.
4. If it is out of specification, loosen the screw (G) and adjust the screw (A) (refer to item "3-14 A/C Head tilt Adjustment".)
5. If the adjustment is performed, confirm the tape path condition according to Post Limit Confirmation procedure (item 3-12).

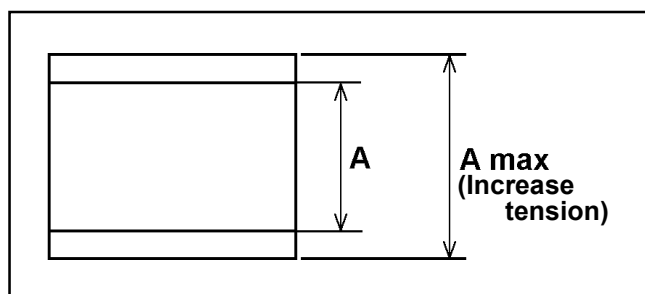


Figure 3-16-1

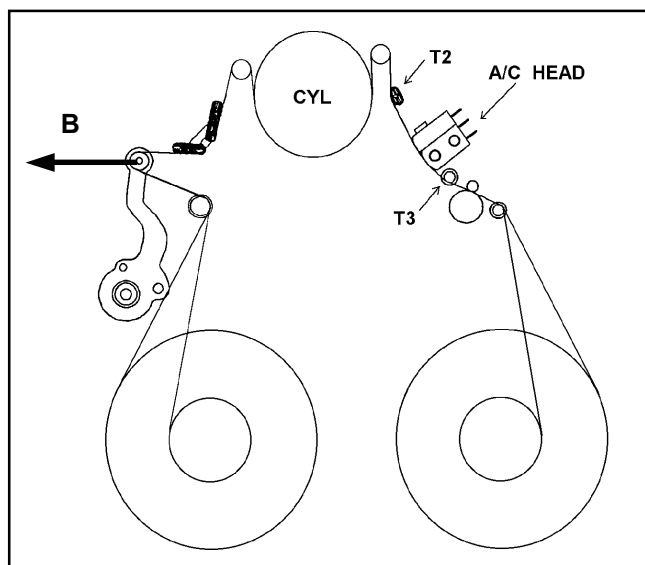


Figure 3-16-2

3-17. A/C Head Height Confirmation

SPEC	CUE : $A=A_{max}$ CTL : $C_1, C_2 \geq 1.8V$
TEST POINT	CUE AUDIO : TP4102 (RF/CUE) CTL : TP30 (SERVO)
ADJ.	SCREW B, H (A/C Head)
MODE	25M mode PLAY
TAPE	NTSC : VFM3580KM or VFM3580KL (14 to 22min) [PAL : VFM3680KM or VFM3680KL] (14 to 22min)
TOOL	VFK1150A (Nut Driver) VFK1190 (Hex Wrench)

1. Press and Lift up A/C Head lightly (refer to figure 3-13-4) then confirm that the CTL and CUE output level is within the specification.
2. If it is out of spec., loosen the screw (H) and adjust the screw (B) until Cue output is maximized. (refer to item "3-15 A/C Head Height Adjustment".)

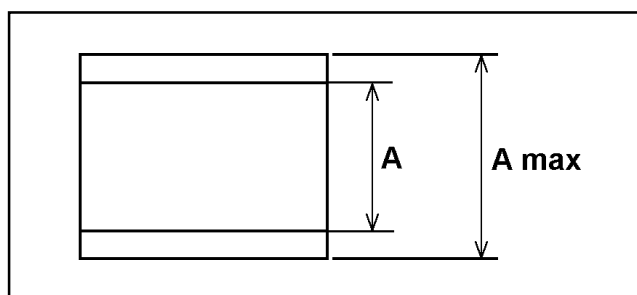


Figure 3-17-1

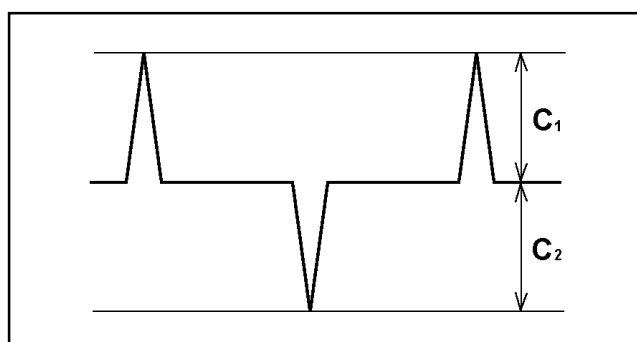


Figure 3-17-2

3-18. A/C Head Azimuth and X-value Adjustment

SPEC	25M mode : $-250\mu s \leq t1, t2 \leq +250\mu s$ 50M mode : $-125\mu s \leq t1, t2 \leq +125\mu s$	TEST POINT	ENV R/P L	TP6302 : RF/CUE
			HSW R/P L	TP233 : SERVO
			CUE	TP4102 : RF/CUE
			CTL	TP30 : SERVO
ADJ.	A/C Head each screw(C,D,F,G) and hole (E)	M. EQ	Oscilloscope	
MODE	See below	TOOL	VFK0357 (Eccentric Driver)	
TAPE	NTSC : VFM3582KM or VFM3582KL (PAL : VFM3682KM or VFM3682KL)		VFK1148A (Hex Driver) VFK1209A (Torque Driver) VFK0912 or VFK1375 (Hex Bit)	

(CTL Reference)

Reference (Trigger)
rising edge : refer to below figure.

(VTR mode)

Mode
25M/50M : ATF PLAY mode by RP Head.
25M mode : A15 : RPL LIN25
50M mode : A13 : RPL LIN50

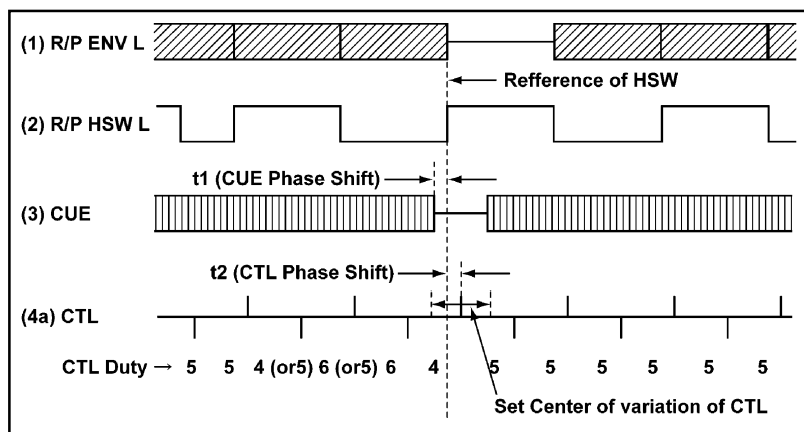


Figure 3-18-1

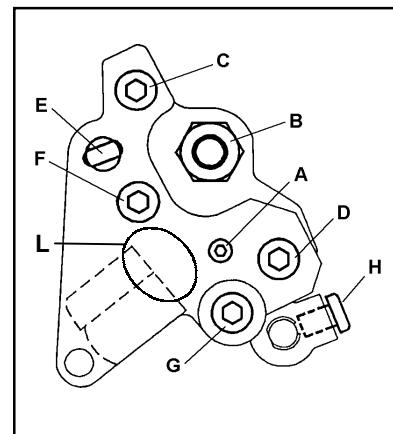


Figure 3-18-2

1. Set the VTR to ATF PLAY mode by RP HEAD.
2. Set the VTR in 25M mode (A15 : RPL LIN25) and playback an X-value Alignment tape.
3. Confirm that the rising edge of CTL match with the front position of non-recorded portion of CUE. If not adjust the Screw (F) to match both phase. (refer to "3-13. A/C Head Adjustment Method").
4. Adjust A/C Head Horizontal position so that CTL trigger at the frame start match with the reference of HSW (t2). The frame start CTL is located at the edge between 6 : 4 and 5 : 5 portion. To adjust A/C Head Horizontal position, loosen the screw (C) and (D), then adjust the hole (E) by VFK0357. After adjustment, tighten the screw (C) and (D) with 24.6cN (2.5Kgf) torque.
5. Hit the top plate (portion L as shown in figure) of A/C Head lightly, then confirm the phase is not shifted finally.
6. Confirm that t1 and t2 is within SPEC. If not, return to item 3.
7. Set the VTR in 50M mode (A13 : RPL LIN50) and confirm the timing is within the specification. If it is out of spec., return to item3.
8. Fix the screw by Lock Tight glue after the adjustment (refer to item 3-27).

3-19. Compensation Adjustment of X Value

SPEC	A10 : X VALUE 50 → 0 ± 27 A11 : X VALUE 25 → 0 ± 27
TEST POINT	-----
ADJ.	Search button
MODE	PLAY
TAPE	NTSC:VFM3580KM or VFM3580KL (PAL:VFM3680KM or VFM3680KL)
TOOL	-----

1. Select A10: X VALUE 50 in SERVO MENU.
2. Playback the alignment tape.
3. Press Search button so that the following character is displayed on the screen.

PLAY ALIGNMENT TAPE OK?
OK : <SEAR CH>
NO : <Menu>

4. Keep pressing the Search button until the compensation value on the A10: X VALUE 50 is renewed. (The value disappears in a moment before it is renewed.)
5. Select A11: X VALUE 25 in SERVO MENU.
6. Playback the alignment tape.
7. Press Search button so that the following character is displayed on the screen.

PLAY ALIGNMENT TAPE OK?
OK : <SEAR CH>
NO : <Menu>

8. Keep pressing the Search button until the compensation value on the A11: X VALUE 25 is renewed. (The value disappears in a moment before it is renewed.)
9. Confirm that the compensation value meets the SPEC.
10. If it is out of SPEC., perform X-value Adjustment (item 3-18).

3-20. REV Tape Path Confirmation and Adjustment (T4 Post Height Adjustment)

SPEC	①. C1, C2 ≥ Cp1×0.75, Cp2×0.75 NOTE: C1, C2 : CTL output REV (x-1) mode Cp1, Cp2 : CTL output PLAY (x1) mode. ②. Lower limit at T3 post on REV mode. ③. Curl should not appear on tape at T3 and T4 post.
TEST POINT	CTL : TP30 : SERVO
ADJ.	T4 post height
MODE	See below
TAPE	NTSC:VFM3580KM or VFM3580KL (PAL:VFM3680KM or VFM3680KL)
TOOL	VFK1151 (Nut Driver)

(VTR mode)

Mode
[PLAY (+1)]
PLAY on 25M mode
[REV (-1)]
SHTL × -1 on 25M mode

1. Place the unit into REV X1 mode and confirm that the CTL output level becomes more than 75% of that of play mode. Confirm that the tape path becomes lower limit at T3 post and the tape does not have curl at T3 and T4 post.
2. If it is out of specification, adjust T4 post by following procedure.
3. Turn the Nut of T4 post clockwise or counter clockwise by the tape limit condition at T3 post. The rotation angle for each adjustment should be less than 45 degree in order to prevent the tape damage.
4. If still it is out of specification, adjust T4 post height by following the item "3-1. Post Height Pre-adjustment procedure".
5. Fix the screw by Lock Tight glue after the adjustment (refer to item 3-27).

[T4 Nut Adjustment Direction]

Direction	CTL Level	Condition of lower limit on T3 Post
Tighten	Increase	Tape touch to be strong
Loosen	Decrease	Tape touch to be weak

[Post limit]

Post	A	B	C	D	E	F
T3	NG	NG	OK	NG	NG	NG
T4	OK	OK	OK	NG	NG	NG

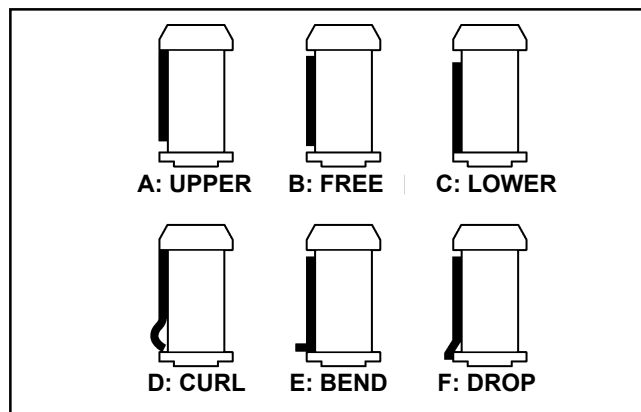


Figure 3-20-1

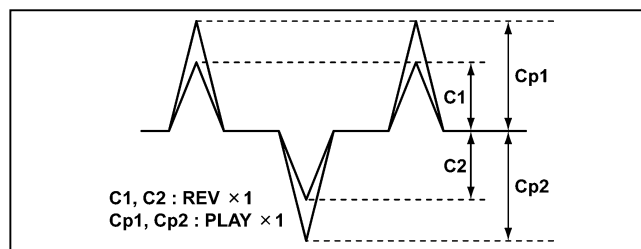


Figure 3-20-2

3-21. CTL Self Recording Level Confirmation

TEST POINT	TP30 : SERVO
ADJ.	T4 post height
MODE	PLAY, REV×1, REV×0.2
TAPE	Blank Tape M cassette 66 min
M.EQ	Oscilloscope

(Specification for confirmation)

CTL Output Level : C1, C2	
PLAY	
C1, C2 ≥ 1.8 V	
REV (SHTL x-1)	
C1, C2 ≥ 1.4 V	
REV (SHTL x-0.2)	
C1, C2 ≥ 1.2 V	

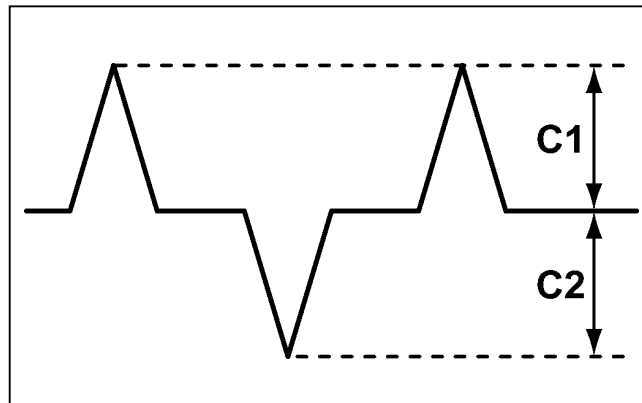


Figure 3-21-1

1. Confirm that the each screws are fixed on A/C Head.
2. Place the Unit into DVCPRO 25M REC mode and playback the recorded portion.
3. Confirm that the CTL level is within the specification at PLAY and REV mode.
4. If CTL level is out of specification at PLAY mode, confirm the height of A/C Head (refer to item "3-17. A/C Head Height Confirmation")
5. If CTL level is out of specification at REV mode, confirm the height of T4 Post (refer to item "3-20. REV Tape Path Confirmation and Adjustment").

3-22. Play Tape Path Limit Confirmation

SPEC	Each post limit shown in figure below.
MODE	PLAY
TAPE	VFM3580KM/L or Blank Tape

Post Name	Tape limit (refer to figure)						Adjustment Point	Adjustment Item
	A	B	C	D	E	F		
S5 post	NG	OK	OK	NG	NG	NG	S4, S5 post	Post Height Pre-Adjustment
S4 (Tension) post	NG	NG	OK	NG	NG	NG	S1, T1 post	ENV Waveform Adjustment
S1 post	OK	NG	NG	NG	NG	NG	A/C Head tilt screw	A/C Head Tilt Adjustment
T1 post	OK	NG	NG	NG	NG	NG	T4 post	Post Height Pre-Adjustment
T3 post	NG	NG	OK	NG	NG	NG		
T4 post	OK	OK	OK	NG	NG	NG		

Table 3-22-1

1. Place the unit into PLAY mode and confirm that the each post limits is within the specification.
2. If it is out of specification, adjust the post height by following the each adjustment procedure (Refer to above table).

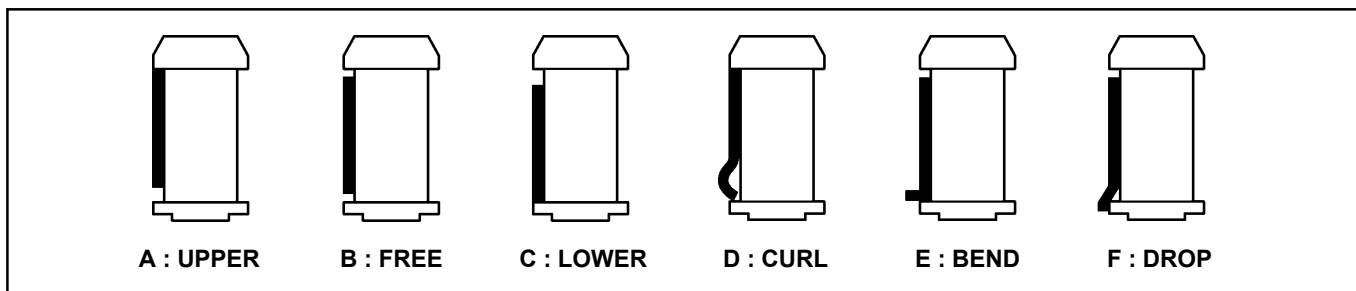


Figure 3-22-1

3-23. Confirmation of Envelope on REV, REW and FF mode

SPEC	See Figure 3-23-1
TEST POINT	See below
MODE	REV, REW, FF
TAPE	NTSC : VFM3580KM or VFM3580KL (PAL : VFM3680KM or VFM3680KL)
M. EQ	Oscilloscope

(Test Point)

Signal	Test Point
(1) R/P ENV L	TP6302 : RF/CUE
(2) R/P HSW L	TP233 : SERVO

Table 3-23-1

- Confirm that the Envelope waveform becomes in the specification at REV, REW and FF mode as following.
 - Waveform must be Diamond Style. (Figure 3-23-1)
 - All the peak level must be more than 90% of maximum level.
 $V/V_{max} \geq 0.9$
- If it is out of spec, adjust S4 post height. (refer to item "3-1.Post Height Pre-Adjustment")

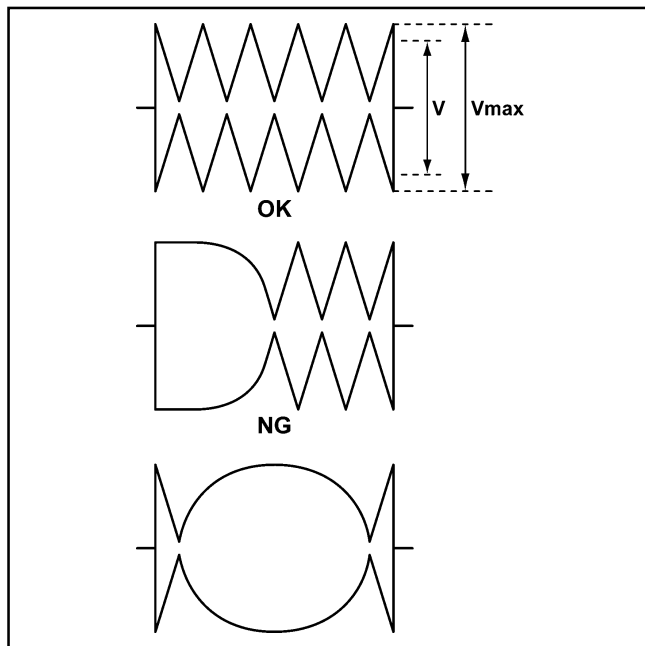


Figure 3-23-1

3-24. Confirmation of Play Start Envelope

SPEC	Envelope Waveform signal should be rising up immediately at PLAY mode.
TEST POINT	Refer to Table 3-23-1 on previous item "3-23. Confirmation of Envelope on REV/REW and FF mode".
MODE	REW/REV → PLAY, FF → PLAY, Loading completion (STOP) → PLAY
TAPE	L Cassette (123min, Recorded tape) Tape beginning portion
M. EQ	Oscilloscope

This adjustment must be done after Envelope Waveform Adjustment.

- Confirm that the envelope appears immediately when the mode is changed from REW to PLAY, REV to PLAY, FF to PLAY, and STOP to PLAY mode.
- If not, adjust S4 post height. (refer to item "Post Height Pre-Adjustment")

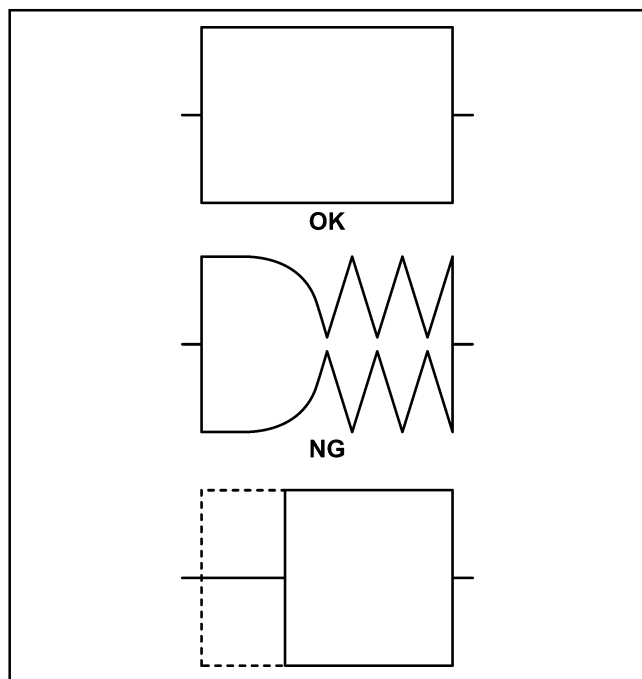


Figure 3-24-1

3-25. REV mode Tape Path Limit Confirmation

SPEC	Each post limit shown in below figure
MODE	REV
TAPE	NTSC : VFM3580KM or VFM3580KL (PAL : VFM3680KM or VFM3680KL)

Post Name	Tape Limit (Refer to figure 3-25-1)					
	A	B	C	D	E	F
S5 Post	OK	OK	OK	NG	NG	NG
S4 Post (Tension Post)	NG	OK	OK	NG	NG	NG
S1 Post	OK	NG	NG	NG	NG	NG
T1 Post	OK	OK	OK	NG	NG	NG
T3 Post	NG	NG	OK	NG	NG	NG
T4 Post	OK	OK	OK	NG	NG	NG

1. Place unit into REV mode and confirm the each post limits is within the specification.
2. If it is out of specification, adjust the post height by following the each adjustment procedure (Refer to Table 3-22-1 on item 3-22)

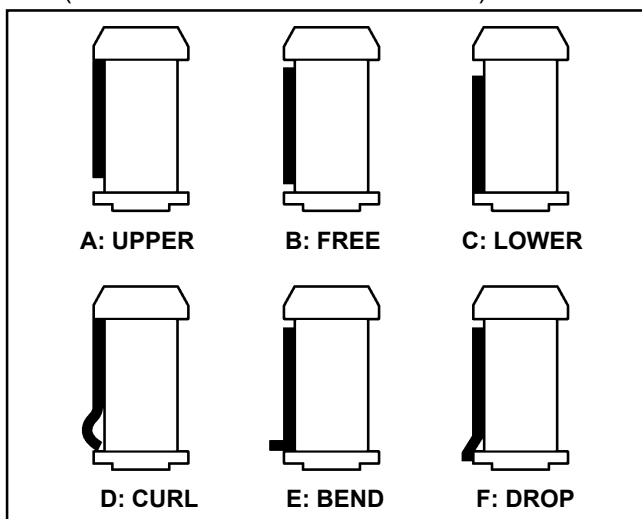


Figure 3-25-1

3-26. FF, REW mode Tape Path Limit Confirmation

SPEC	Each post limit shown in below figure
MODE	FF, REW
TAPE	NTSC : VFM3580KM or VFM3580KL (PAL : VFM3680KM or VFM3680KL)

Post Name	Tape Limit (Refer to figure 3-25-1)					
	A	B	C	D	E	F
S5 Post	OK	OK	OK	NG	NG	NG
S4 Post (Tension Post)	NG	OK	OK	NG	NG	NG
S1 Post	OK	NG	NG	NG	NG	NG
T1 Post	OK	OK	OK	NG	NG	NG
T3 Post	OK	OK	OK	NG	NG	NG
T4 Post	OK	OK	OK	NG	NG	NG

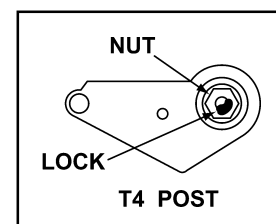
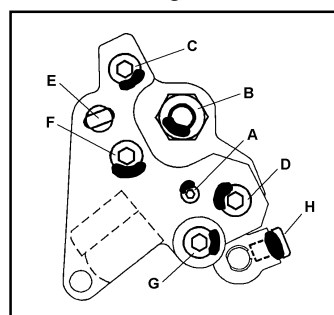
1. Place the unit into FF and REW mode and confirm the each post limits is within the specification.
2. If out of specification, adjust the post height by following the each adjustment procedure (Refer to Table 3-22-1 on item 3-22)

3-27. Screw Lock Tight of A/C Head and T3, T4 Posts

<Screw Lock Tight of A/C Head>

	SCREW A	OTHER SCREWS
Lock Tight glue Quantity	1/3 of the screw	1/3 of the screw

1. Fix the screw by the Lock Tight glue after A/C Head Adjustment as shown in figure below.
2. Melt the glue before adjust each screws.



<Screw Lock Tight of T3 and T4 Post>

	SCREW A	OTHER SCREWS
Lock Tight glue Quantity	1/4 of the screw	1/4 of the screw

1. Fix the Nut by the Lock Tight Grew after T4 Post Height Adjustment.
2. Melt the grew before performing adjustment.

3-28. Confirmation of Tape Damage for Long Tape Playback

<Confirmation procedure>

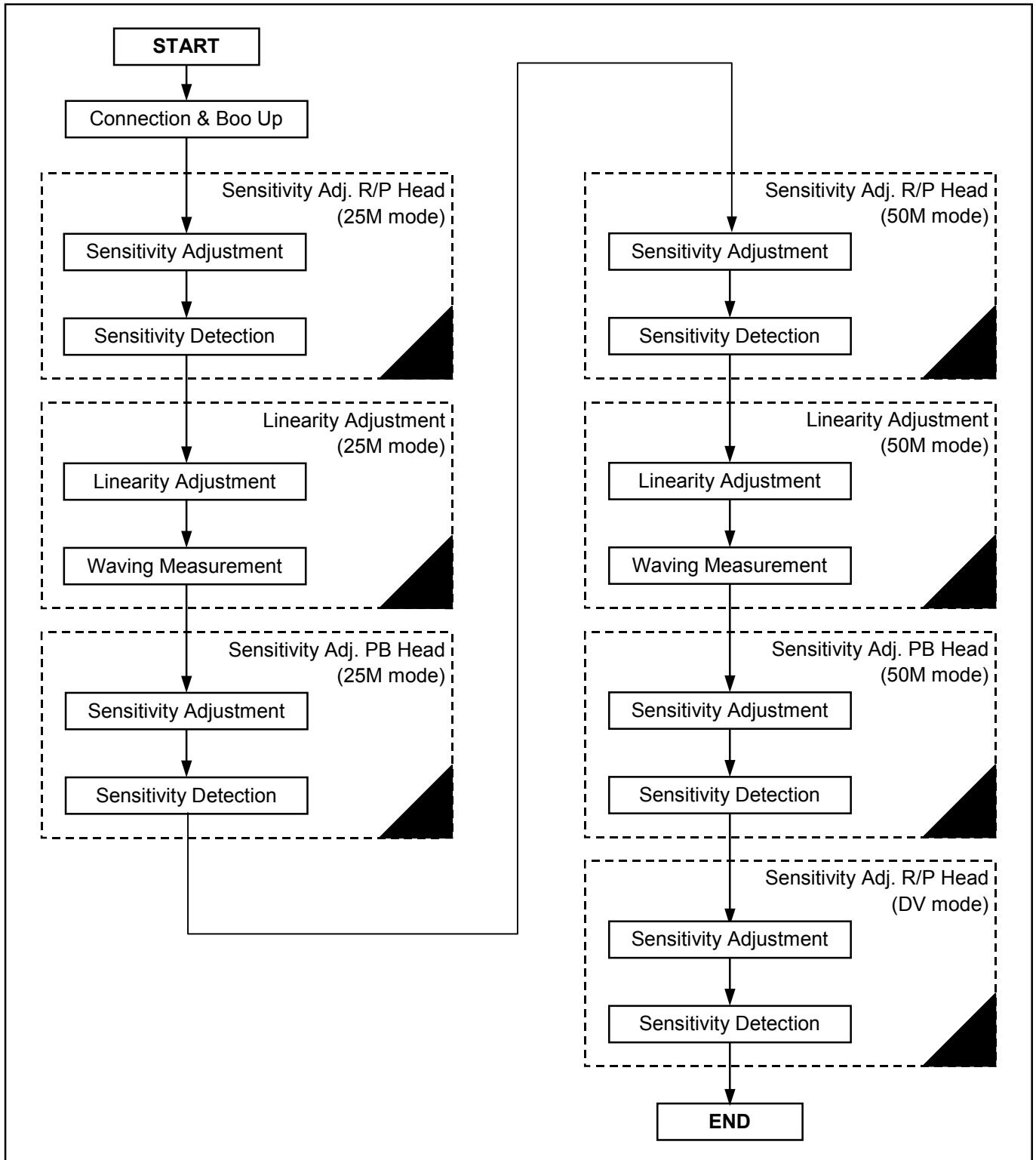
Item	Confirmation mode	Specification
Tape Damage ①	×0.5 speed (step slow)	Tape damage should not occur on tape at lower limit of T3 and T4 post.
	<Tape> Long time L cassette: thin tape (AJ-5P92LP : recorded tape) Tape beginning portion	
Tape Damage ②	SHTL	Tape damage should not occur on tape at lower limit of T3 and T4 post.
	Repeat FWD←→REV mode (maximum speed at Pinch ON condition)	
	<Tape> Long time L cassette: thin tape (AJ-5P92LP : recorded tape) Tape end portion	

1. Place the unit into above "Confirmation mode".
2. Confirm that tape damage doesn't occur on tape at lower limit of T3 and T4 post.
3. If it is out of SPEC., adjust T4 post and return to item 3-20.

NOTE: Recording mode of the tape which is used for this confirmation is DVCPRO50 mode.

3-29. LISTA Adjustment Procedure

Procedure



<Information>

Mode changes 25M \longleftrightarrow 50M of LISTA software can be performed on the LISTA main menu by pressing “0” key on Keyboard of PC..

3-30. LISTA Connection and Boot Up

TEST POINT	ATF ERROR	R/P-L	TP6701 RF/CUE
		R/P-R	TP6801 RF/CUE
		PB-L	TP6701 RF/CUE
	TRIGGER (H SW)	R/P-L	TP233 SERVO (F1)
		R/P-R	TP235 SERVO (F1)
		PB-L	TP232 SERVO (F1)
M. EQ.	PC (Personal Computer) (A/D board should be installed)		
TAPE	NTSC : VFM3581KM or VFM3581KL (LISTA), VFM3000EDS (DV LISTA) (PAL : VFM3681KM or VFM3681KL (LISTA), VFM3000EDS (DV LISTA))		
TOOL	VFK1481K (LISTA Software), VFK1186 (LISTA Cable), VFK1300 (AD Converter board)		

<Classified list for LISTA Connection>

1. Connect the LISTA cable to A/D Board in the PC.
2. Connect the clips of the LISTA cable to test point on the P.C.Board.
3. Boot up the LISTA software on DOS mode.

◆ How to install and boot Up ◆

Make a directory like C : Lista and Copy all files in the floppy disk (VFK1481K : LISTA Software) to it on PC.
Type "**LISTA**" and press **ENTER** key, then the LISTA software VFK1481K boot up.

4. After the LISTA software boot up, <<< FORMAT SELECT >>> display appears. Select the "DVCPRO 50" so that the <<VTR SELECT>> Menu appears.
5. Select "AJ-D950" in <<VTR SELECT>> menu so that the <<Alignment Tape Select>> Menu appears.

Linearity monitor system of track
using ATF error signal for DVCPRO

-- LISTA PRO --

<<< FORMAT SELECT >>>

<1> DVCPRO

<2> DVCPRO 4X

<3> DVCPRO 50

<4> DVCPRO HD

<5> DV

<6> Quit

Move:Cursor key Select:[ENTER] key

Linearity monitor system of track
using ATF error signal for DVCPRO

-- LISTA PRO50 --
(for DVCPRO 50 VTR)

<<< VTR SELECT >>>

<1> AJ-D900

<2> AJ-D950

<3> AJ-D90

<4> AJ-PD900

<5> AJ-D960

<6> AJ-D970

Move:Cursor key Select:[ENTER] key

6. Select the Serial number of the Alignment tape on the screen. If LISTA software does not have alignment tape data registered, data entry is needed. Press the ESC key, then main menu is displayed on the screen. And select the item "<4> Alignment Tape" to enter the data on the attachment sheet which is enclosed with alignment tape.
7. If LISTA software has the data of alignment tape, select the serial number of Alignment tape, then message "ok?(y/n)" appears on the screen. And press "Y" or "ENTER" key so that LISTA main menu is displayed on screen.

<< In case Alignment Tape data is already registered >>

<< Alignment Tape Select >>						Last Select [4]
No.	Serial No.	PAL/NTSC	Check Sum	Type	Entry Date	
[1]	000	NTSC	0.0	18 um	- - -	
[2]	000	PAL	0.0	18 um	- - -	
[3]	000	NTSC	0.0	10 um	- - -	
[4]	9903697	NTSC	-0.3	18 um	02-09-2001	

Move:Cursor key Select:[ENTER] key Cancel:[ESC] key

<< In case Alignment Tape data is not registered >>

<< Alignment Tape Select >>						Last Select [1]
No.	Serial No.	PAL/NTSC	Check Sum	Type	Entry Date	
[1]	000	NTSC	0.0	18 um	- - -	
[2]	000	PAL	0.0	18 um	- - -	
[3]	000	NTSC	0.0	10 um	- - -	

Move:Cursor key Select:[ENTER] key Cancel:[ESC] key

3-31. How to Enter the Attachment Data of Alignment Tape

1. Select the item "<4> Alignment Tape" on the LISTA main menu.
2. Select the item "<2> ENTRY" on the "alignment Tape" menu.
3. After the screen of <<Alignment Tape Data Entry>> is displayed, first input the Serial Number of Alignment tape printed on the label. And input the number "0" or "1" to select the PAL/NTSC. Following the format select (PAL/NTSC), Select tape type (18μm/10μm/9μm).
4. After selecting the tape type, the frame for entering the DATA and CHECK SUM appears on the screen. Input the numerical value on the data sheet which are enclosed with alignment tape. If input the wrong number, the error message appears on the screen after the Check Sum calculation, then confirm the data on the sheet.
5. After the data entry, the Screen returns to "Lista Main" menu. Confirm the serial number of Alignment tape.

```

Linearity monitor system of track          *
using ATF error signal for DVCPRO

--   L I S T A   P R O   --

<1> Sensitivity Measurement [ --- mV/ $\mu$ m ]
<2> Linearity Measurement
<3> Data Save / Load      [ C:¥ ]
<4> Alignment Tape        [ 000(NTSC) ]
<5> Peak Hold Setting     [ 30 sec ]
<6> ATF Error Signal Monitor
<7> Quit

Move:Cursor key    Select:[ENTER] key / Number[1]-[7]    Change VTR:[V]key
Change FORMAT:[F]key

```

ALIGNMENT TAPE

<1> SELECT

<2> ENTRY

<3> DELETE

<4> ALL DATA

<5> RETURN TO MENU

Move:Cursor key Select:[ENTER] key / Number[1]-[5]

<< Alignment Tape Data Entry >>
Serial No.: 990.697(NTSC) 18 um

[1]	-0.5	[11]	-0.4	[21]	0.2	[31]	0.3
[2]	-0.4	[12]	-0.6	[22]	0.2	[32]	0.2
[3]	-0.2	[13]	-0.4	[23]	0.4	[33]	0.4
[4]	0.2	[14]	-0.5	[24]	0.3	[34]	0.3
[5]	0.1	[15]	-0.5	[25]	0.2	[35]	0.3
[6]	0.1	[16]	-0.5	[26]	0.1	[36]	0.3
[7]	0.0	[17]	-0.3	[27]	0.2	[37]	0.2
[8]	-0.1	[18]	-0.1	[28]	0.2		
[9]	-0.3	[19]	0.0	[29]	0.1	CheckSum _	
[10]	-0.4	[20]	0.0	[30]	0.3		

Move:Cursor key Select:[ENTER] key Cancel:[ESC] key

```
<< Alignment Tape Data Entry >>

Tape Serial No.  ? 9903697
PAL(0) / NTSC(1) ? 1
Tape Type 16um(0 or [ENTER]) / 10um(1) ? 0_
```

* Tape Type: 18um = DVCPRO
10um = DV

3-32. RP Head Sensitivity Adjustment and Sensitivity Detection (25M Mode)

SPEC.	Sensitivity 100±10 (mV/μm)	
TEST POINT	① ATF (R/P-L)	TP6701 RF/CUE
	② H SW (R/P-L)	TP233 SERVO (F1)
	③ GND	TG6001 RF/CUE
VTR MODE	PLAYBACK	
ADJUSTMENT	SERVO Adjustment Menu: "A14 : RPL GAIN 25"	
TAPE	NTSC: VFM3581KM or VFM3581KL (PAL: VFM3681KM or VFM3681KL)	

Set the LISTA software in 25M Mode. 25M and 50M mode can be changed by "0" key.

1. Set the VTR in Service Mode to open the servo menu and select the item of "A14: RPL GAIN 25" in the "SERVO ADJUST" menu.
2. Playback a LISTA alignment tape (VFM3581KM or VFM3581KL).
3. Select the LISTA (6) ATF Error Signal Monitor so that the screen of <ATF Error Signal monitor> appears (refer to figure 3-32-2) Then press Enter to start the software.
4. When the picture is appeared as shown in figure 3-32-3, adjust ATF Gain (A14: RPL GAIN 25) so that the "Sens. Value:" is in the Specification. To return the main menu, press ESC key.
5. Select Lista Main Menu "(1) Sensitivity Measurement" so that the screen of <ATF Error Signal monitor> appears (refer to 3-32-2).
6. Playback a Lista alignment tape.
7. Press "Enter" to start the Sensitivity measurement.
8. Confirm that the sensitivity value is within the specification on the <Sensitivity Measurement Finish> screen.
9. If it is out of specification, return to item 3.

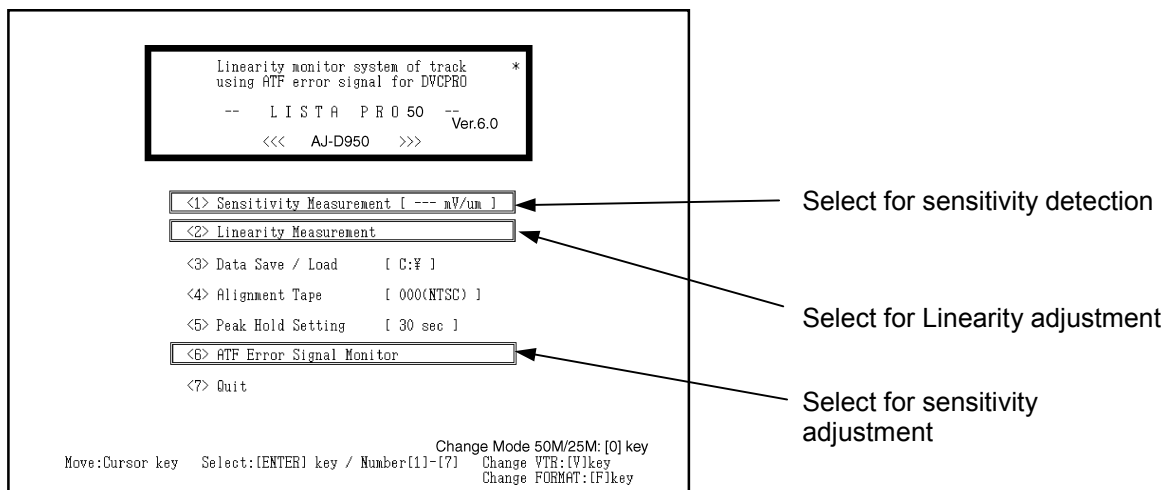


Figure 3-32-1

In case "ATF Error Signal" or "sensitivity Measurement" is selected.

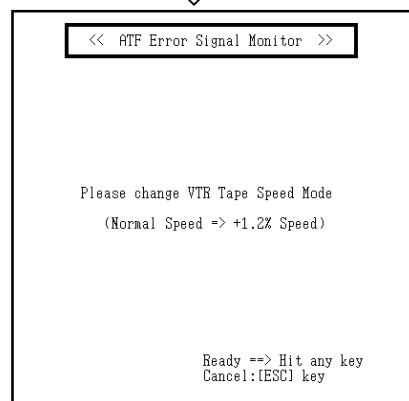
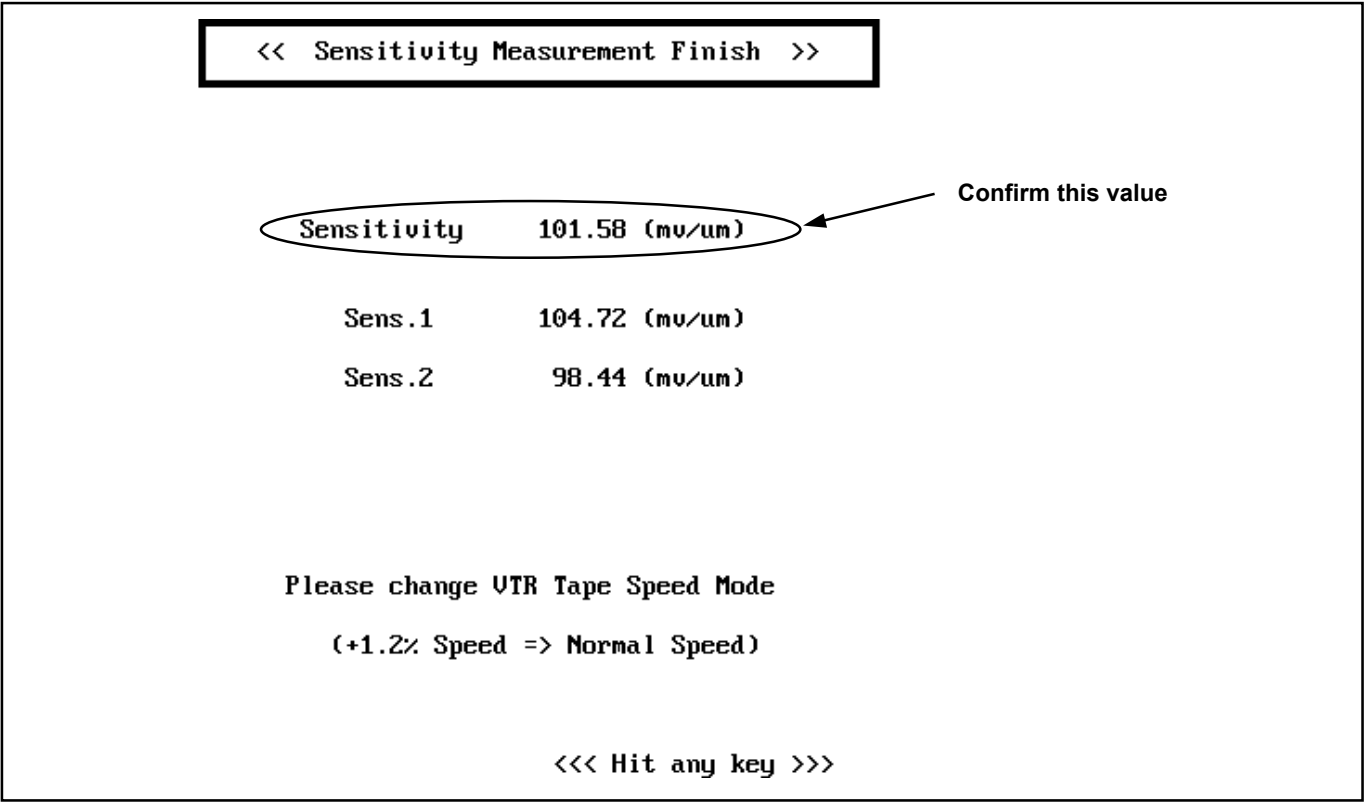
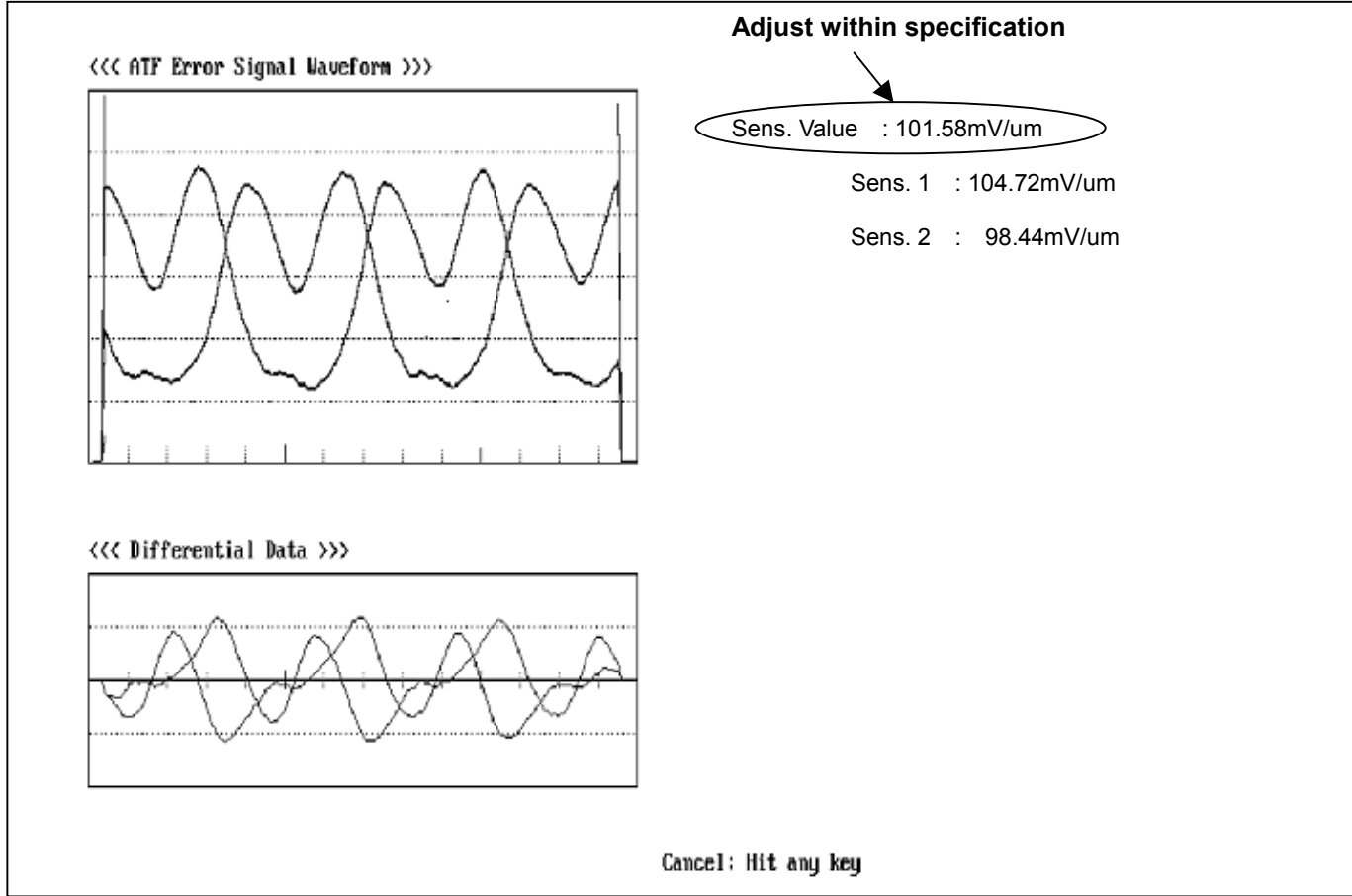


Figure 3-32-2

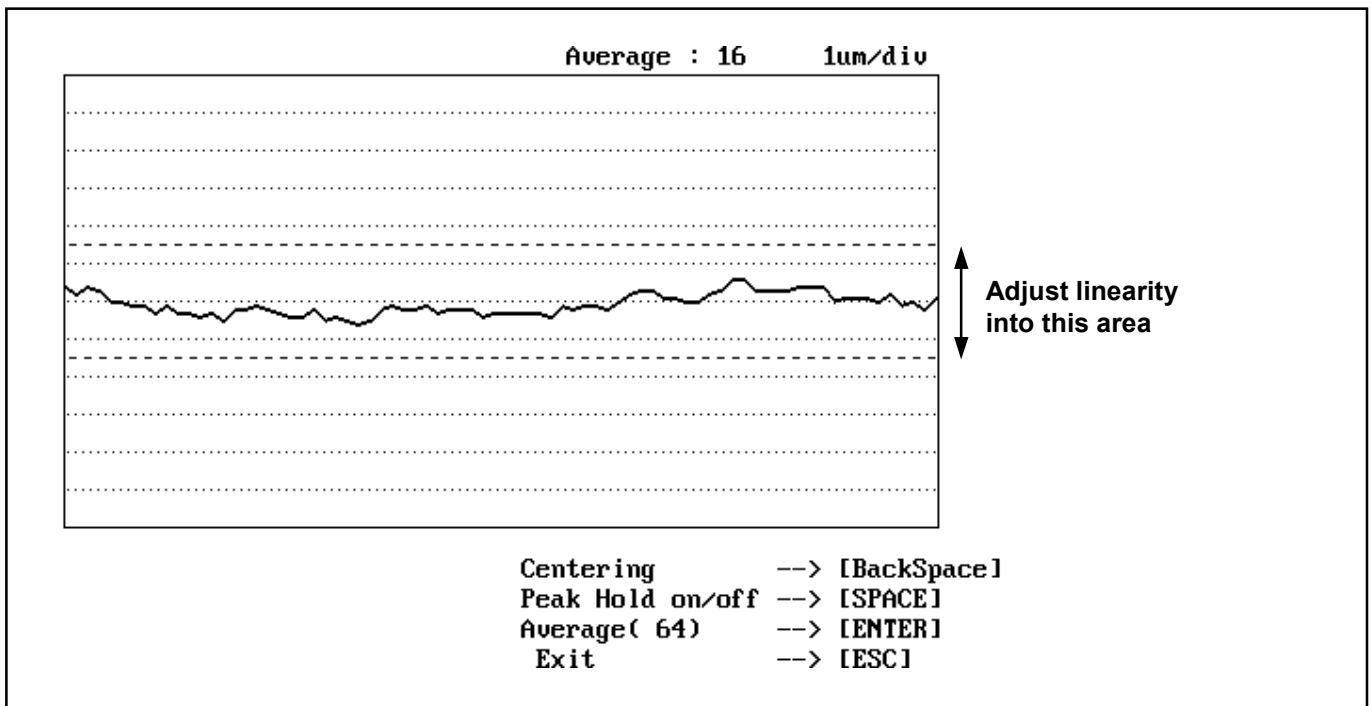


3-33. LISTA Linearity Adjustment and Waving Measurement (25M mode)

SPEC.	Linearity : less than 3 μ m, Waving : less than 1.5 μ m	
TEST POINT	① ATF (R/P-L)	TP6701 RF/CUE
	② H SW (R/P-L)	TP233 SERVO (F1)
	③ GND	TG6001 RF/CUE
VTR MODE	PLAYBACK	
ADJ. MODE	SERVO ADJUSTMENT MENU: "A15: RPL LIN25"	
ADJUST	S1 and T1 Post Height	
TOOL	VFK1149 or VFK1149B (Post Driver)	
TAPE	NTSC: VFM3581KM or VFM3581KL(LISTA) (PAL: VFM3681KM or VFM3681KL(LISTA))	

Linearity Adjustment Procedures

1. Connect the each clips of LISTA cable to test points.
 2. Set the Lista software in 25M mode. 25M and 50M mode can be changed by "0" key.
 3. Set the VTR in Service Mode to open the servo menu and select the item of "A15: RPL LIN 25".
 4. Playback the LISTA Alignment Tape.
 5. Select the item "<2> Linearity Measurement" on the LISTA main menu, and then linearity waveform appears on the screen.
 6. When the waveform as shown below is displayed on the screen, press the "BS (Back Space)" key to move the waveform at the center of the scale on screen. Adjust S1 and T1 post height by using the post driver so that the linearity waveform becomes as flat as possible, and it should be within the specification.
- ◆ Adjust linearity, to have waveform in between the red dot lines on the screen.



POINT :

The part of left side of waveform (entrance side) is adjusted by height of S1 post and the part of right side of waveform (exit side) is adjusted by height of T1 post.

Lower part of above waveform of figure displays lead of Cylinder.

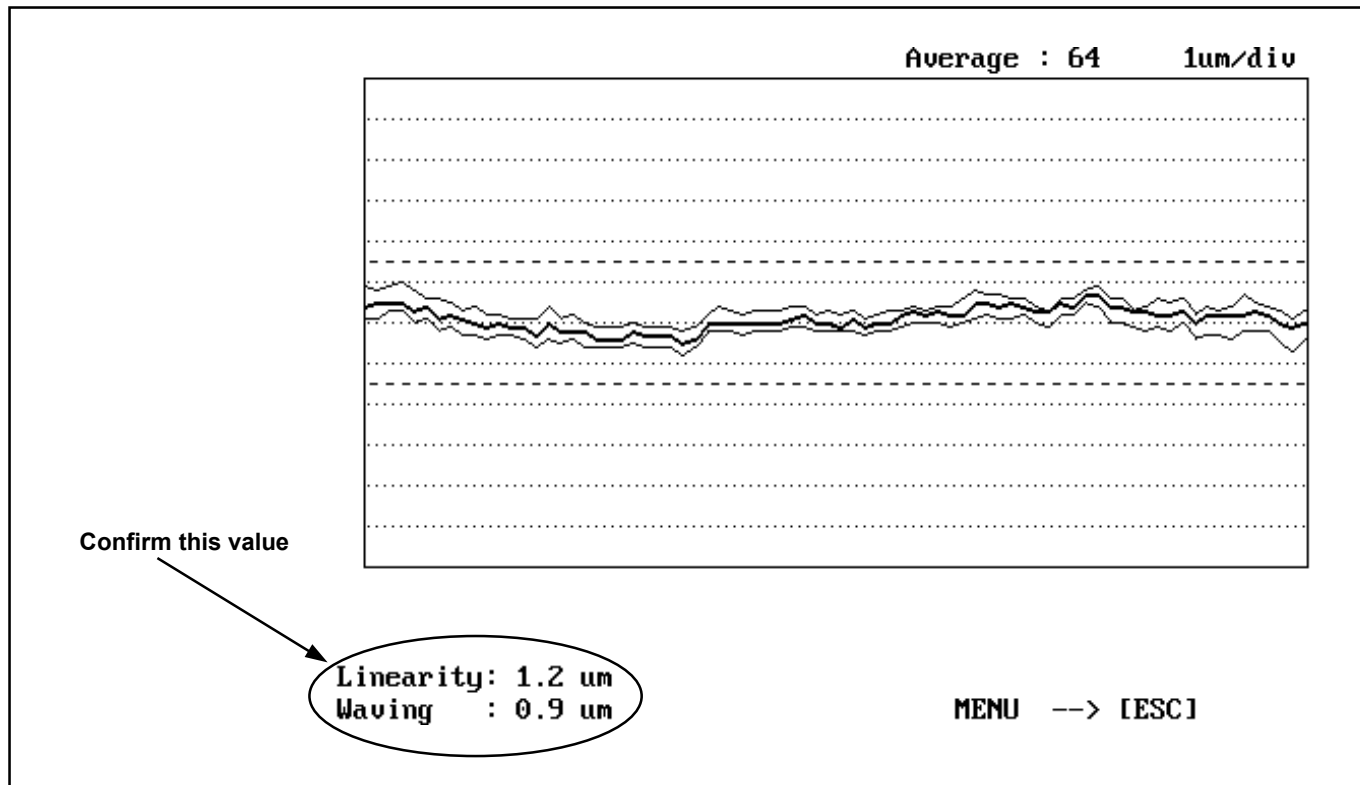
When the post driver is removed from upper part of post, linearity waveform may be changed.

After finishing this adjustment, eject the tape and insert the tape again to confirm the shape of linearity waveform isn't changed.

7. After finishing the Linearity Adjustment, measure the numerical value of linearity and waving.

Waving Measurement Procedures

1. Press "SPACE" key to perform the Peak Hold in 30 seconds when linearity is displayed.
2. After finishing the Peak Hold, press "SHIFT" and "}" key simultaneously on the Key Board, then the numerical values of "Linearity" and "Waving" is displayed on left lower portion of screen. And confirm the numerical values are in the specification. Also confirm the waving is same level from entrance side to exit side. If the "Linearity" and "Waving" are out of specification and also it caused by insufficient limit of entrance or exit side of envelope, adjust height of S1 and T1 post.
3. After this measurement is finished, press the ESC key to return to the main menu.



Information : How to save the LISTA Data

Linearity waveform data, measurement value and waving value can be saved as one file data to PC.

1. Basically this operation should be performed after linearity and waving measurement is finished.
2. Select the item "<3> Data Save/Load" on the LISTA main menu, and select the item "<1> Save".
3. The linearity waveform as Peak Hold is displayed on the screen, and message "File Name?" appears on the screen. Then enter the File Name less than 8 letters. Nextly enter the Serial No. and press enter, then message "Comment?" appears on the screen, then enter the Comment less than 20 letters. As comment, enter the Model Number, Head Rotation Hours etc to use them for management of each VTR's linearity data.
4. After completion of saving, select the item "<2> Load" of the item "<3> Data Save/Load", then the saved File Name appears on the screen. And select previously saved file to confirm the waveform and numerical value is displayed correctly. By pressing "SHIFT" and "}" key simultaneously on the Key Board, the numerical values of "Linearity" and "Waving" is displayed on left lower portion of screen.

3-34. PB Head LISTA Sensitivity Adjustment and Sensitivity Detection (25M Mode)

SPEC.	Sensitivity 100±10 (mV/μm)	
MODE	SERVO Adjustment Menu "A17 : PBL GAIN 25"	
TEST POINT	① ATF (PB-L)	TP6701 RF/CUE
	② H SW (PB-L)	TP232 SERVO (F1)
	③ GND	TG6001 RF/CUE
ADJUSTMENT	SERVO Adjustment Menu: "A17 : PBL GAIN 25"	
TAPE	NTSC: VFM3581KM or VFM3581KL(LISTA) (PAL: VFM3681KM or VFM3681KL(LISTA))	

1. Open the Service Menu and select "A17: PBL GAIN 25" in the "SERVO ADJUST" menu. Set the Lista software in 25M mode. 25M and 50M mode can be changed by "0" key.
2. Playback a LISTA alignment tape (VFM3581KM or VFM3581KL).
3. Select the LISTA Main Menu "(6) ATF Error Signal Monitor" so that the screen of <ATF Error Signal monitor> appears. Then press Enter to start the software.
4. When the picture is appeared as shown in figure 3-34-3, adjust ATF Gain (A17: PBL GAIN 25) so that the "Sens. Value:" is in the Specification.
5. After finishing the Adjustment, press ESC key to return the main menu.
6. Select the Lista Main Menu "(1) Sensitivity Measurement" so that the screen of <ATF Error Signal monitor> appears (refer to 3-34-2).
7. Playback a Lista alignment tape and press "ENTER" to start the Sensitivity measurement.
8. Confirm that the sensitivity value is within the specification. (refer to figure 3-34-3).
9. If it is out of specification, return to item 3.

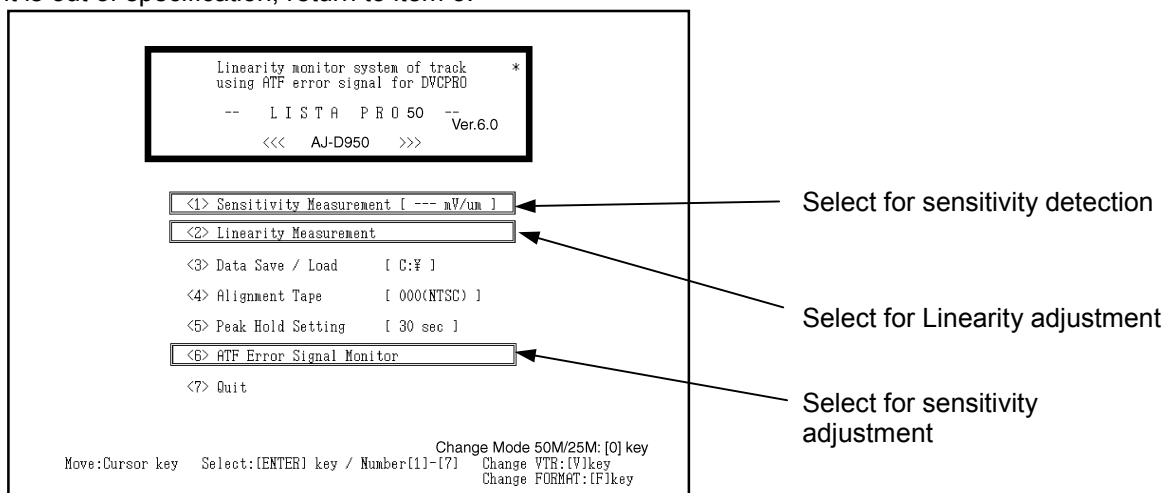


Figure 3-34-1

In case "ATF Error Signal Monitor" or "sensitivity Measurement" is selected.

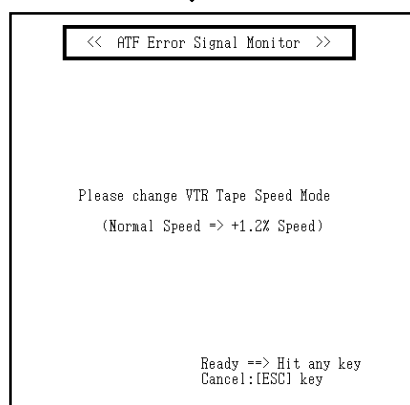
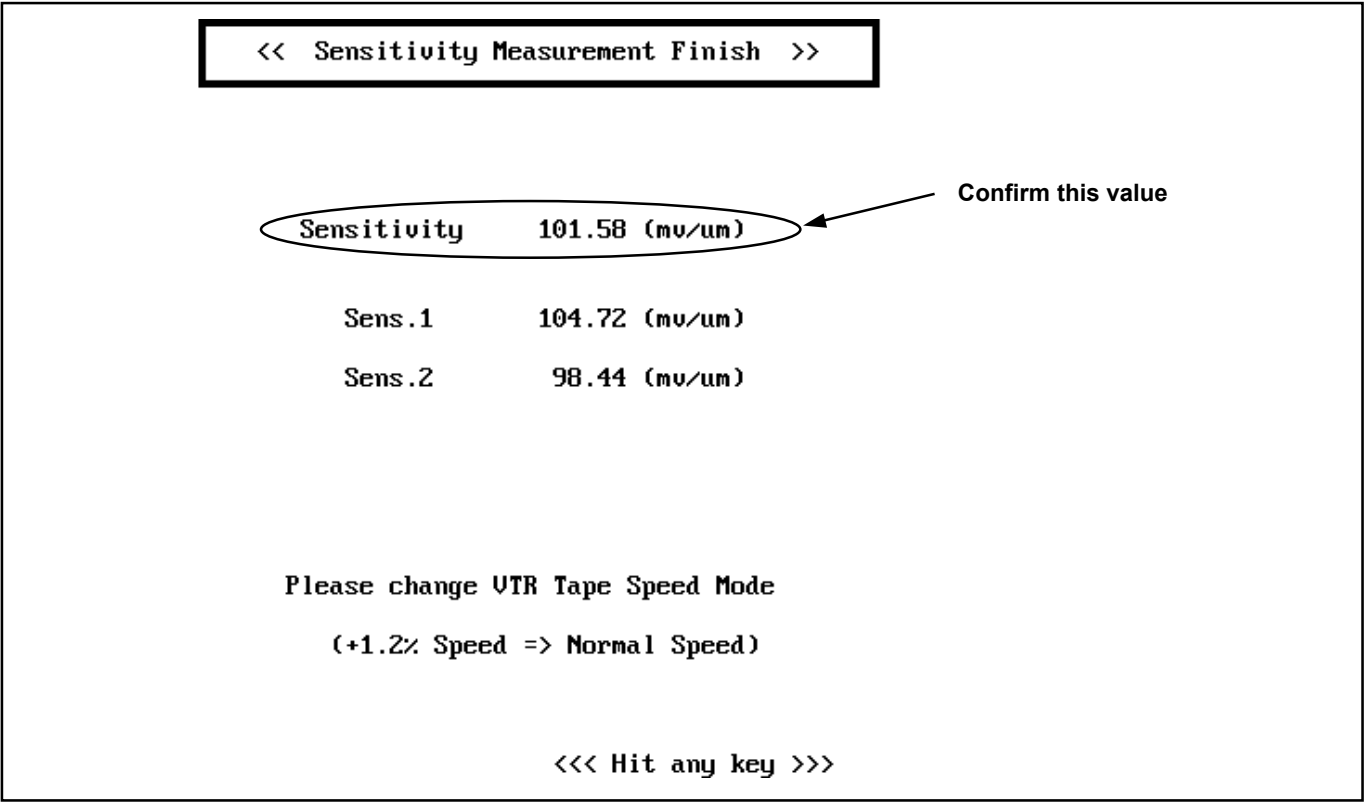
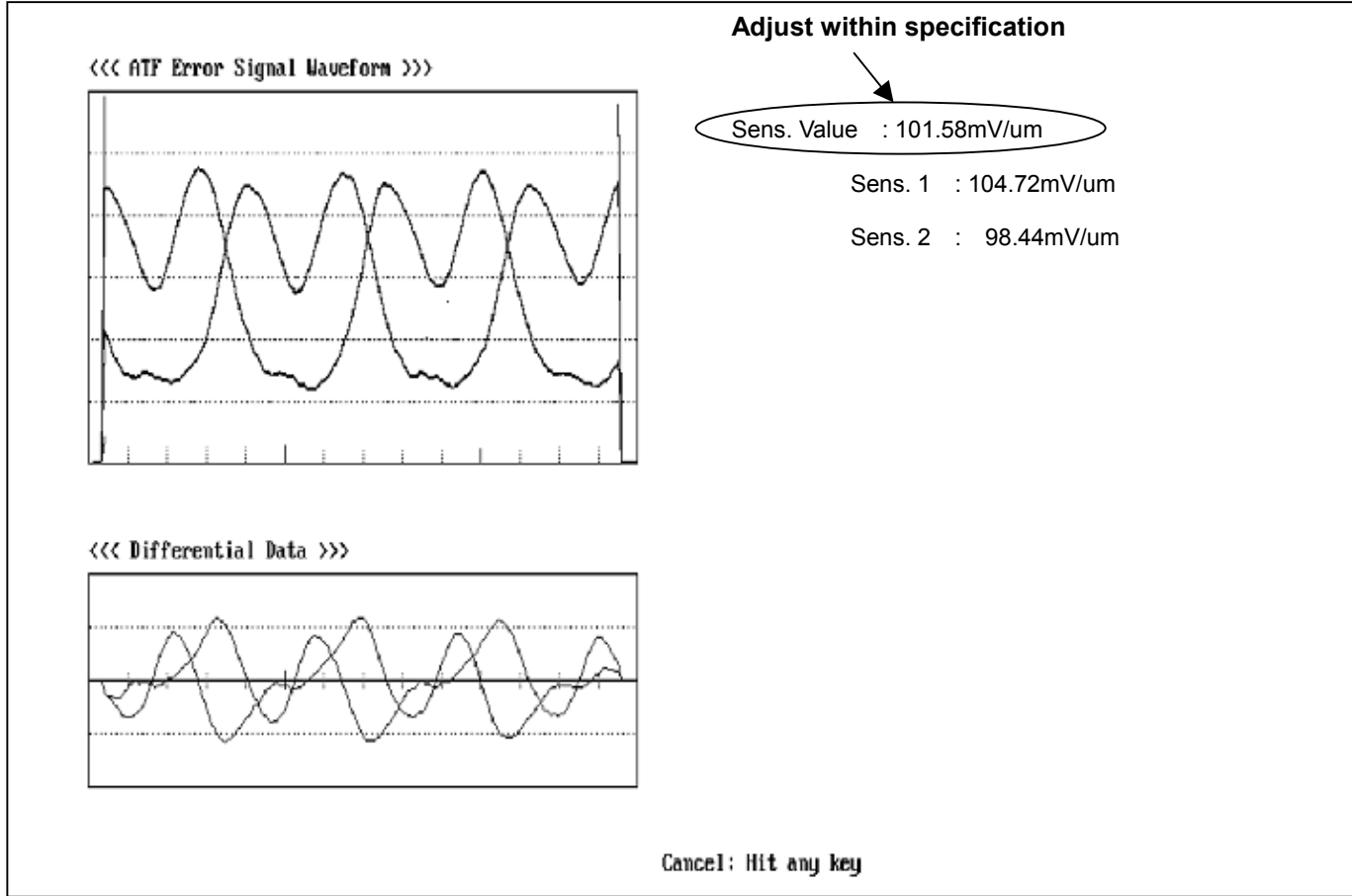


Figure 3-34-2



3-35. RP Head Sensitivity Adjustment and Sensitivity Detection (50M Mode)

SPEC.	Sensitivity 100±10 (mV/μm)	
TEST POINT	① ATF (R/P-L)	TP6701 RF/CUE
	② H SW (R/P-L)	TP233 SERVO (F1)
	③ GND	TG6001 RF/CUE
VTR MODE	PLAYBACK	
ADJUSTMENT	SERVO Adjustment Menu: "A12: RPL GAIN 50"	
TAPE	NTSC: VFM3581KM or VFM3581KL(LISTA) (PAL: VFM3681KM or VFM3681KL(LISTA))	

Set the LISTA software in 50M Mode. 25M and 50M mode can be changed "0" key.

1. Set the VTR in Service Mode to open the servo menu and select the item of "A12: RPL GAIN 50" in the "SERVO ADJUST" menu.
2. Playback a LISTA alignment tape (VFM3581KM or VFM3581KL).
3. Select the LISTA (6) ATF Error Signal Monitor so that the screen of <ATF Error Signal monitor> appears. Then press Enter to start the software.
4. When the picture is appeared as shown in figure 3-35-1, adjust ATF Gain (A12: RPL GAIN 50) so that the "Sens. Value:" is in the Specification. To return the main menu, press ESC key.
5. Select Lista Main Menu "(1) Sensitivity Measurement" so that the screen of <ATF Error Signal monitor> appears.
6. Playback a Lista alignment tape.
7. Press "Enter" to start the Sensitivity measurement.
8. Confirm that the sensitivity value is within the specification on the <Sensitivity Measurement Finish> screen. (refer to figure 3-35-2).
9. If it is out of specification, return to item 3.

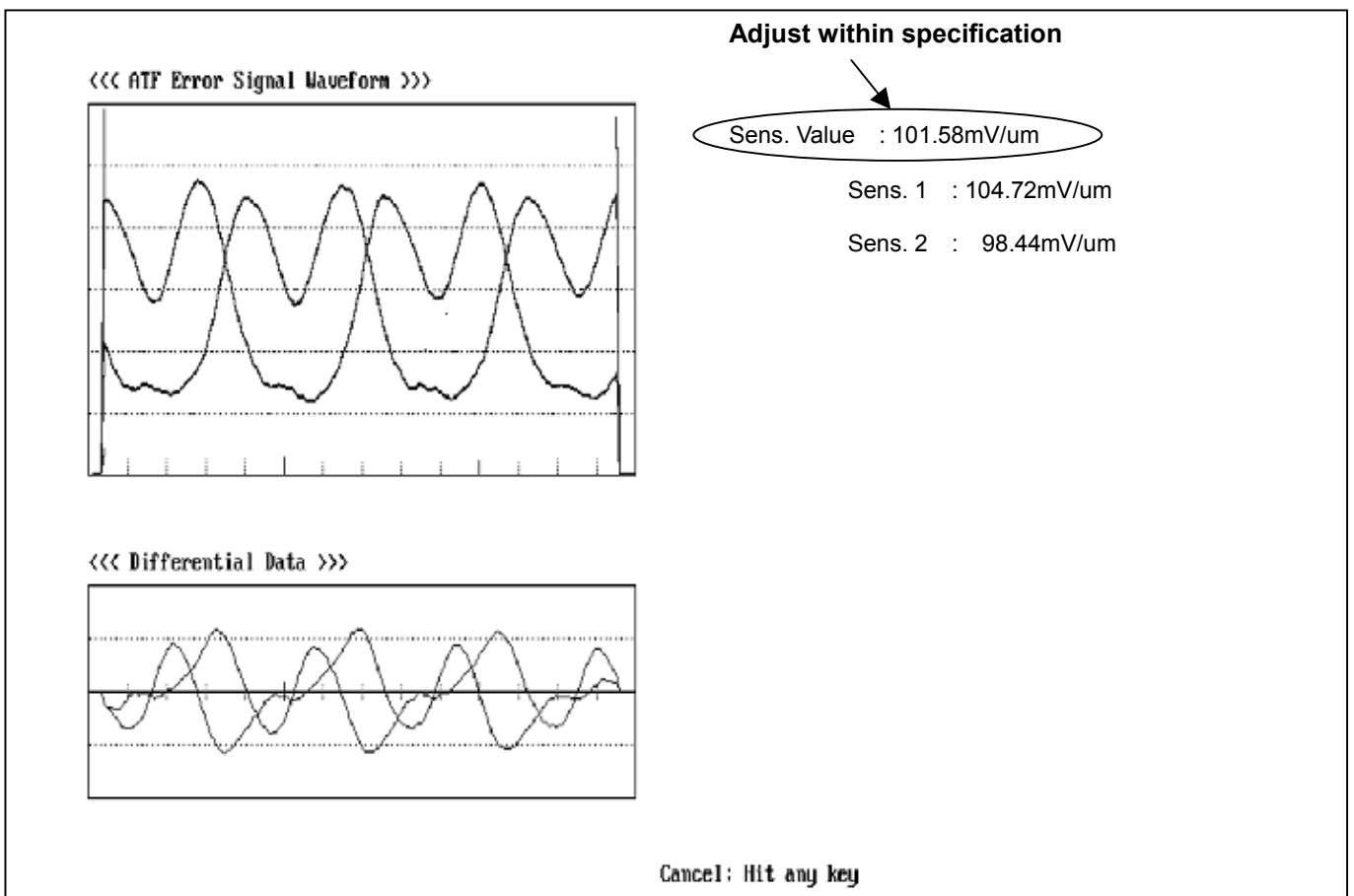


Figure 3-35-1

<< Sensitivity Measurement Finish >>

Sensitivity 101.58 (mv/um)

Confirm this value

Sens.1 104.72 (mv/um)

Sens.2 98.44 (mv/um)

Please change UTR Tape Speed Mode

(+1.2% Speed => Normal Speed)

<<< Hit any key >>>

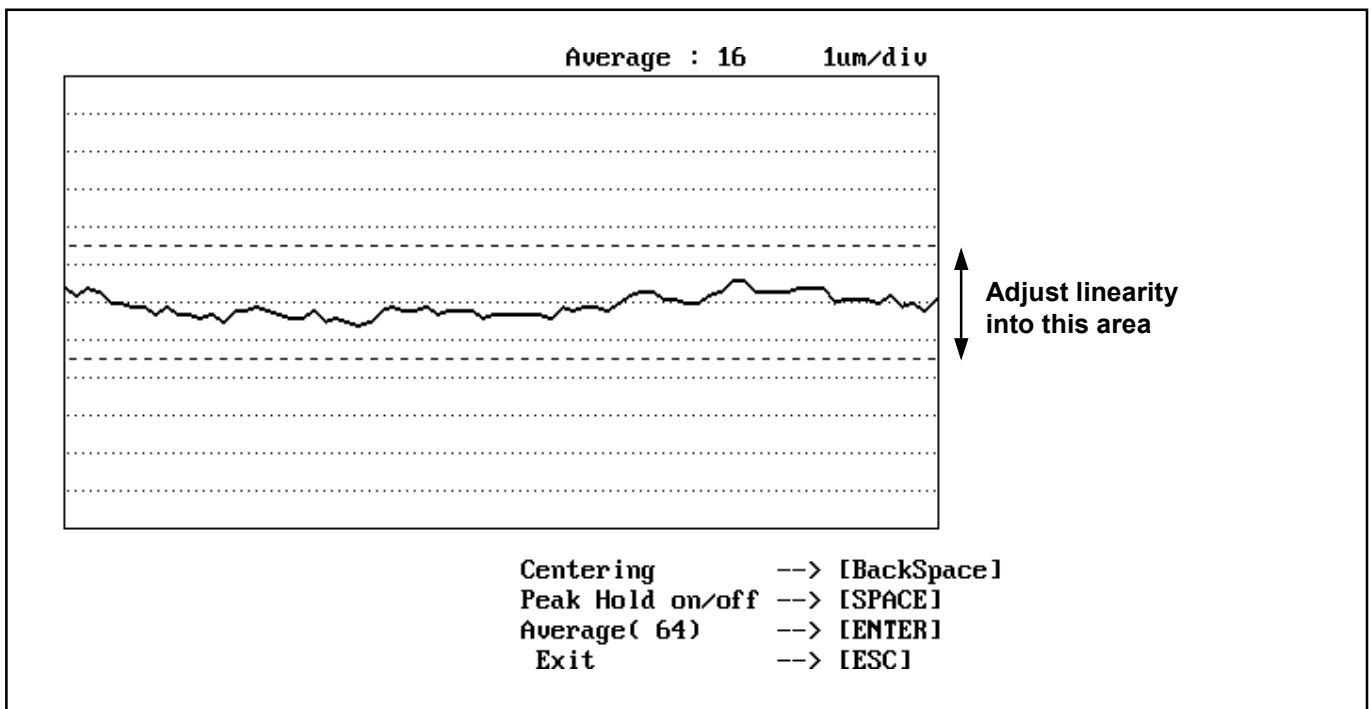
Figure 3-35-2

3-36. LISTA Linearity Adjustment and Waving Measurement (50M mode)

SPEC.	Linearity : less than 3 μ m, Waving : less than 1.5 μ m	
TEST POINT	① ATF (R/P-L)	TP6701 RF/CUE
	② H SW (R/P-L)	TP233 SERVO (F1)
	③ GND	TG6001 RF/CUE
VTR MODE	PLAYBACK	
ADJ. MODE	SERVO ADJUSTMENT MENU: "A13: RPL LIN 50"	
ADJUST	S1 and T1 Post Height	
TOOL	VFK1149 or VFK1149B (Post Driver)	
TAPE	NTSC: VFM3581KM or VFM3581KL(LISTA) (PAL: VFM3681KM or VFM3681KL(LISTA))	

Linearity Adjustment Procedures

1. Connect the each clips of LISTA cable to test points.
2. Set the Lista software in 50M mode. 25M and 50M mode can be changed by "0" key.
3. Set the VTR in Servo menu and select the item of "A13: RPL LIN 50".
4. Playback the LISTA Alignment Tape.
5. Select the item "<2> Linearity Measurement" on the LISTA main menu, and then linearity waveform appears on the screen.
6. When the waveform as shown below is displayed on the screen, press the "BS (Back Space)" key to move the waveform at the center of the scale on screen. Adjust S1 and T1 post height by using the post driver so that the linearity waveform becomes as flat as possible, and it should be within the specification.
- ◆ Adjust linearity, to have waveform in between the red dot lines on the screen.
7. After finishing the Linearity Adjustment, measure the numerical value of linearity and waving.



POINT :

The part of left side of waveform (entrance side) is adjusted by height of S1 post and the part of right side of waveform (exit side) is adjusted by height of T1 post.

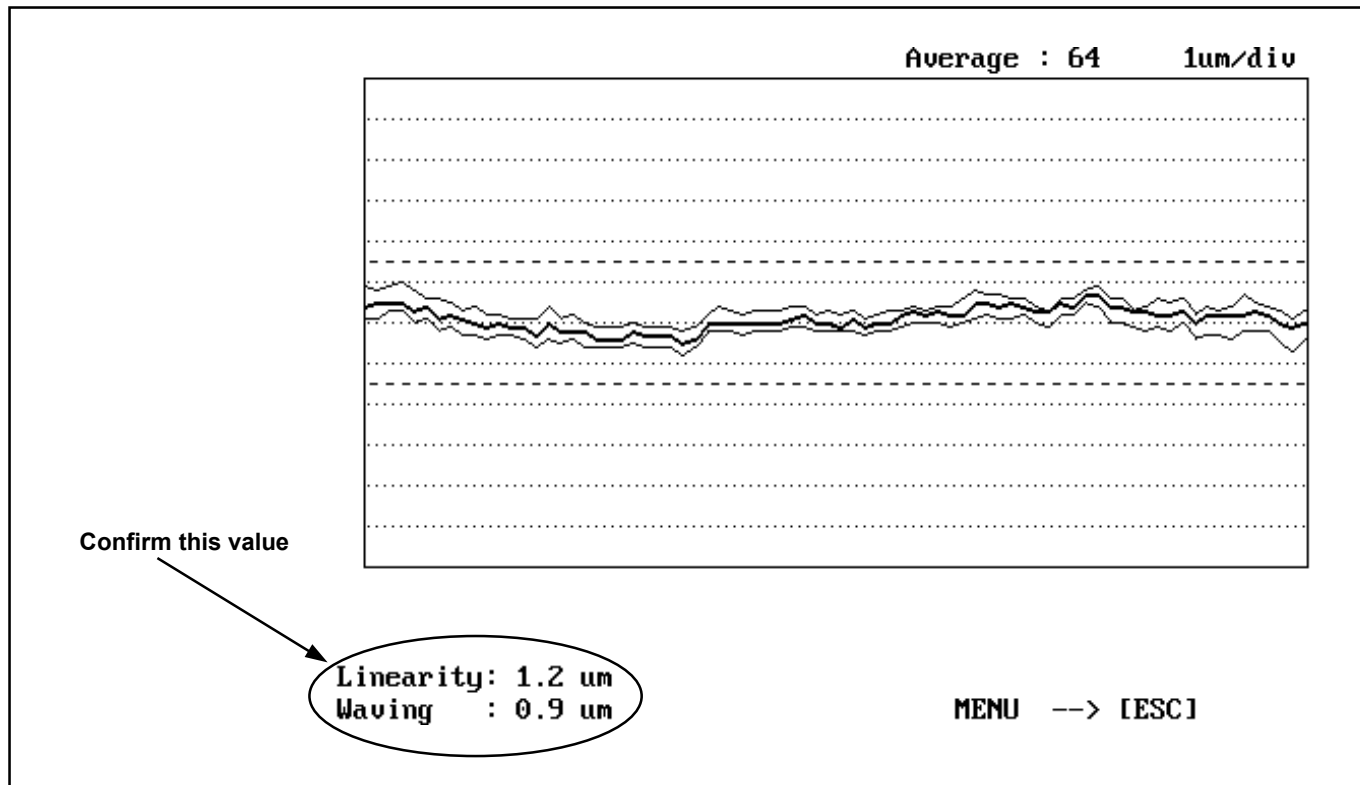
Lower part of above waveform of figure displays lead of Cylinder.

When the post driver is removed from upper part of post, linearity waveform may be changed.

After finishing this adjustment, eject the tape and insert the tape again to confirm the shape of linearity waveform isn't changed.

Waving Measurement Procedures

1. Press "SPACE" key to perform the Peak Hold in 30 seconds when linearity is displayed.
2. After finishing the Peak Hold, press "SHIFT" and "}" key simultaneously on the Key Board, then the numerical values of "Linearity" and "Waving" is displayed on left lower portion of screen. And confirm the numerical values are in the specification. Also confirm the waving is same level from entrance side to exit side. If the "Linearity" and "Waving" are out of specification and also it caused by insufficient limit of entrance or exit side of envelope, adjust height of S1 and T1 post.
3. After this measurement is finished, press the ESC key to return to the main menu.



Information : How to save the LISTA Data

Linearity waveform data, measurement value and waving value can be saved as one file data to PC.

1. Basically this operation should be performed after linearity and waving measurement is finished.
2. Select the item "<3> Data Save/Load" on the LISTA main menu, and select the item "<1> Save".
3. The linearity waveform as Peak Hold is displayed on the screen, and message "File Name?" appears on the screen. Then enter the File Name less than 8 letters. Nextly enter the Serial No. and press enter, then message "Comment?" appears on the screen, then enter the Comment less than 20 letters. As comment, enter the Model Number, Head Rotation Hours etc to use them for management of each VTR's linearity data.
4. After completion of saving, select the item "<2> Load" of the item "<3> Data Save/Load", then the saved File Name appears on the screen. And select previously saved file to confirm the waveform and numerical value is displayed correctly. By pressing "SHIFT" and "}" key simultaneously on the Key Board, the numerical values of "Linearity" and "Waving" is displayed on left lower portion of screen.

3-37. PB Head LISTA Sensitivity Adjustment and Sensitivity Detection (50M Mode)

SPEC.	Sensitivity 100±10 (mV/μm)	
MODE	SERVO Adjustment Menu "A17 : PBL GAIN 25"	
TEST POINT	① ATF (PB-L)	TP6701 RF/CUE
	② H SW (PB-L)	TP232 SERVO (F1)
	③ GND	TG6001 RF/CUE
ADJUSTMENT	SERVO Adjustment Menu: "A16 : PBL GAIN 50"	
TAPE	NTSC: VFM3581KM or VFM3581KL(LISTA) (PAL: VFM3681KM or VFM3681KL(LISTA))	

1. Open the Service Menu and select "A16: PBL GAIN 50" in the "SERVO ADJUST" menu. Set the Lista software in 50M mode.
2. Playback a LISTA alignment tape (VFM3581KM or VFM3581KL).
3. Select the LISTA Main Menu "(6) ATF Error Signal Monitor" so that the screen of <ATF Error Signal monitor> appears. Then press Enter to start the software.
4. When the picture is appeared as shown in figure 3-37-1, adjust ATF Gain (A16: PBL GAIN 50) so that the "Sens. Value:" is in the Specification.
5. After finishing the Adjustment, press ESC key to return the main menu.
6. Select the Lista Main Menu "(1) Sensitivity Measurement" so that the screen of <ATF Error Signal monitor> appears.
7. Playback a Lista alignment tape and press "ENTER" to start the Sensitivity measurement.
8. Confirm that the sensitivity value is within the specification. (refer to figure 3-37-2).
9. If it is out of specification, return to item 3.

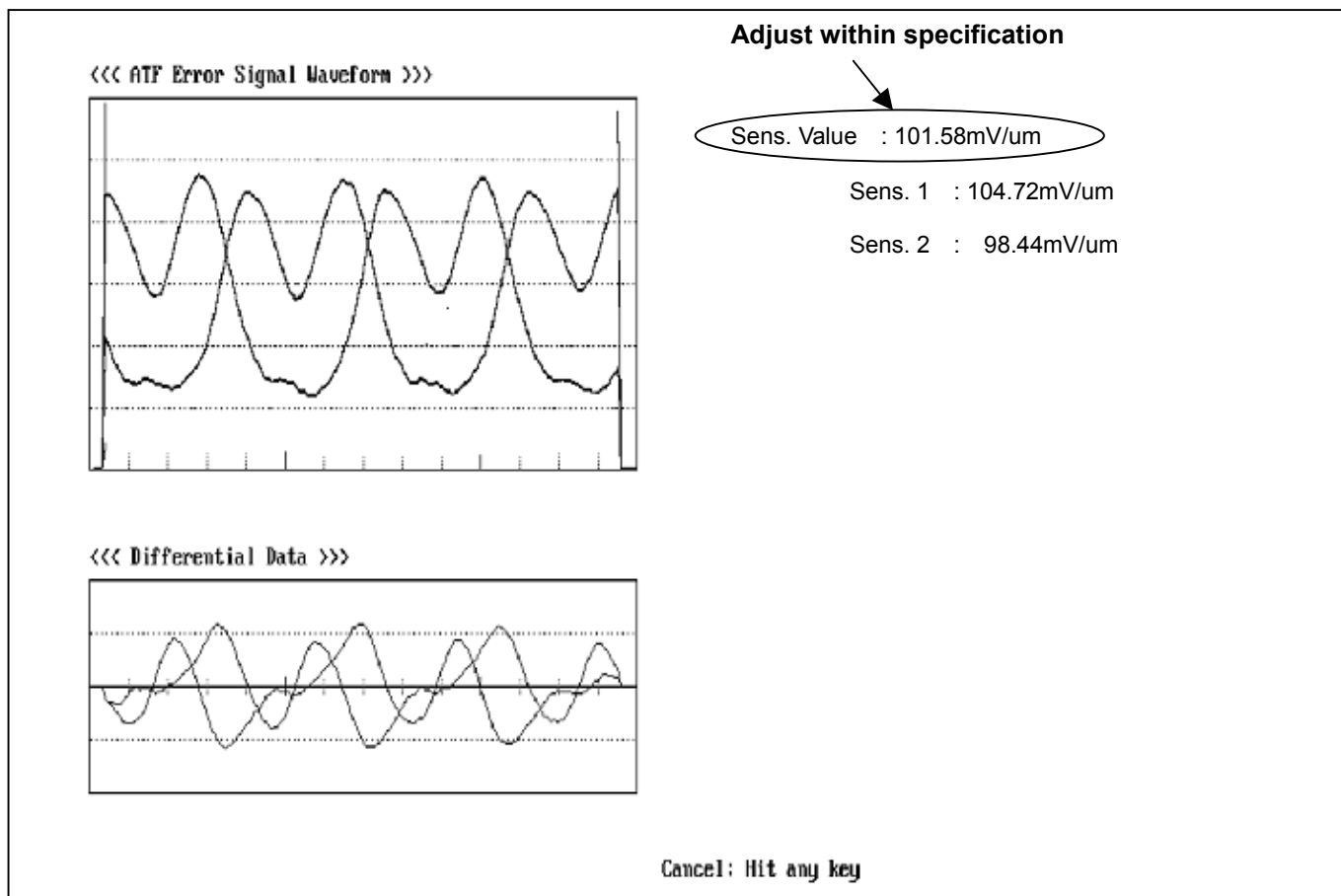


Figure 3-37-1

<< Sensitivity Measurement Finish >>

Sensitivity 101.58 (mv/um)

Confirm this value

Sens.1 104.72 (mv/um)

Sens.2 98.44 (mv/um)

Please change VTR Tape Speed Mode

(+1.2% Speed => Normal Speed)

<<< Hit any key >>>

Figure 3-37-2

3-38. RP HEAD (for DV) Lista Sensitivity Adjustment

SPEC.	Sensitivity: 130±30 (mV/μm)	
VTR MODE	PLAYBACK	
TEST POINT	① ATF (R/P-R)	TP6801 RF/CUE
	② H SW (R/P-R)	TP235 SERVO (F1)
	③ GND	TG6001 RF/CUE
ADJUSTMENT	SERVO Adjustment Menu: “A18: RPR GAIN DV”	
TAPE	VFM3000EDS	

1. Set the LISTA software in 50M Mode. 25M and 50M mode can be changed by “0” key on the key board.
2. Select the item “A18: RPR GAIN DV” in the “SERVO ADJUST” menu.
3. Playback a DV LISTA alignment tape (VFM3000EDS).
4. Select the LISTA (6) ATF Error Signal Monitor so that the screen of <ATF Error Signal monitor> appears. (refer to figure 3-38-2) Then press Enter to start the software.

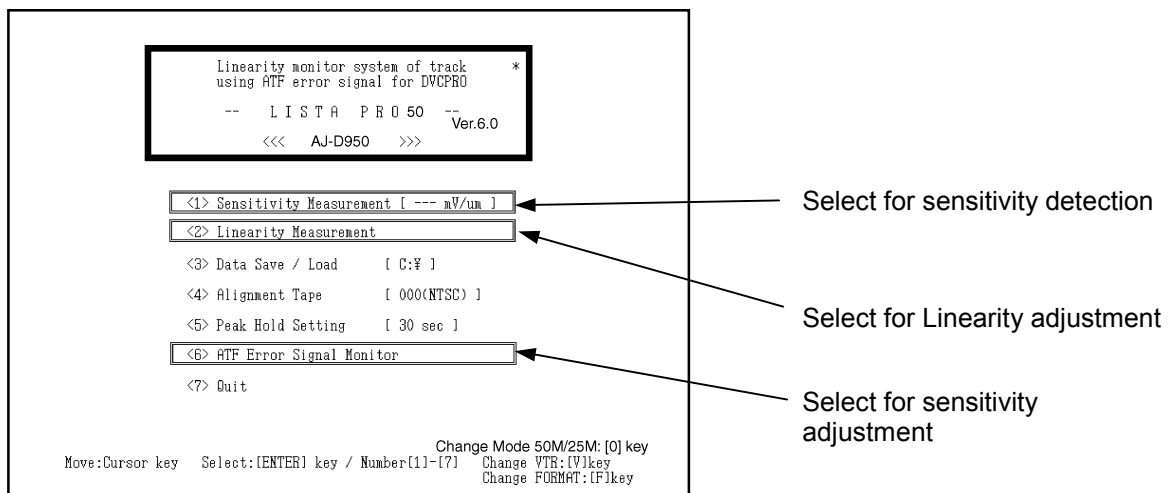


Figure 3-38-1



In case “ATF Error Signal Monitor”
or “sensitivity Measurement” is selected.

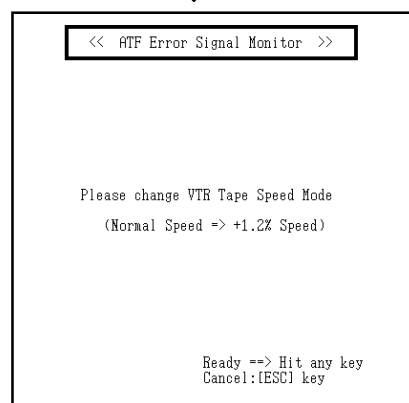


Figure 3-38-2

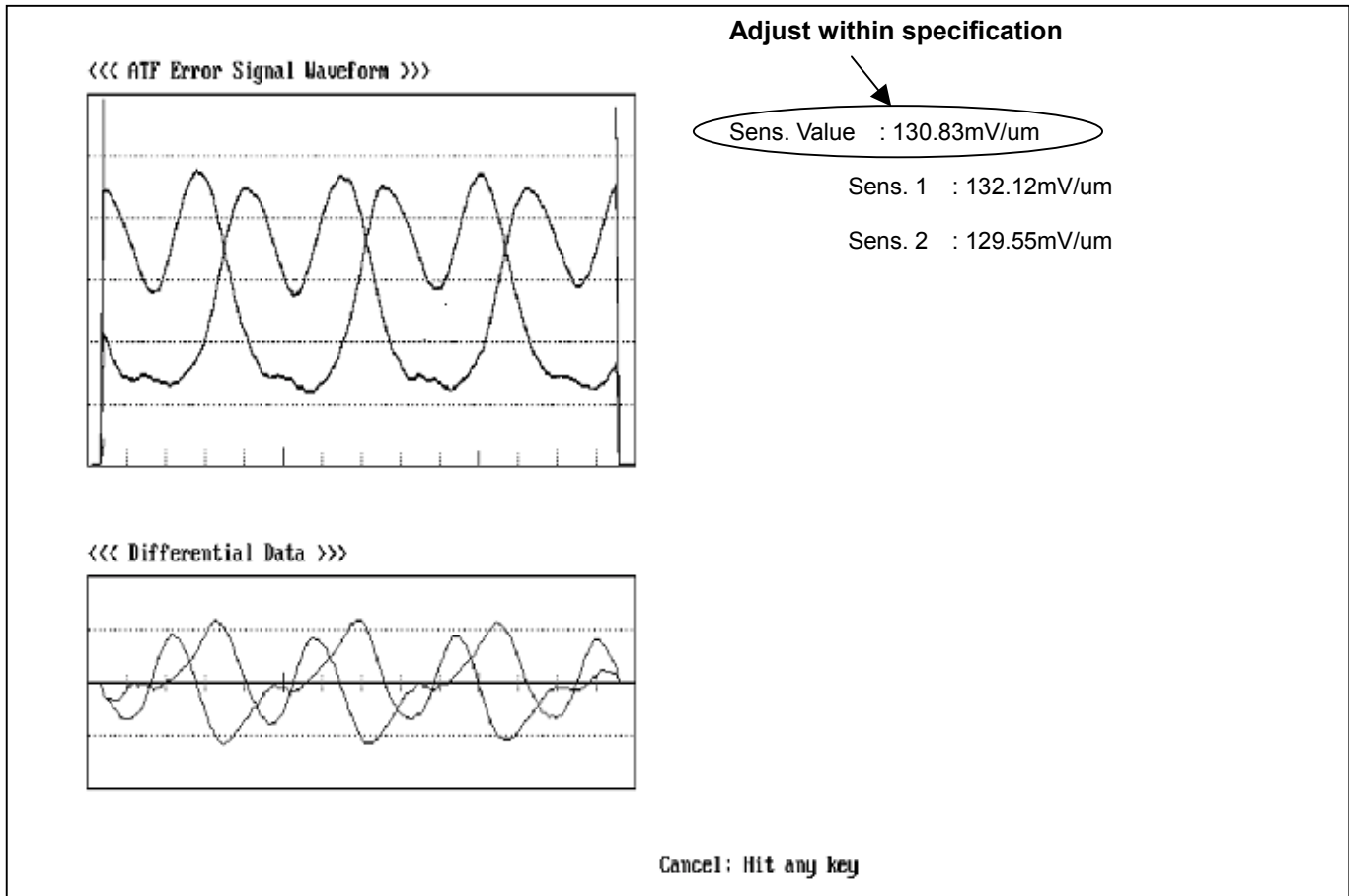


Figure 3-38-3

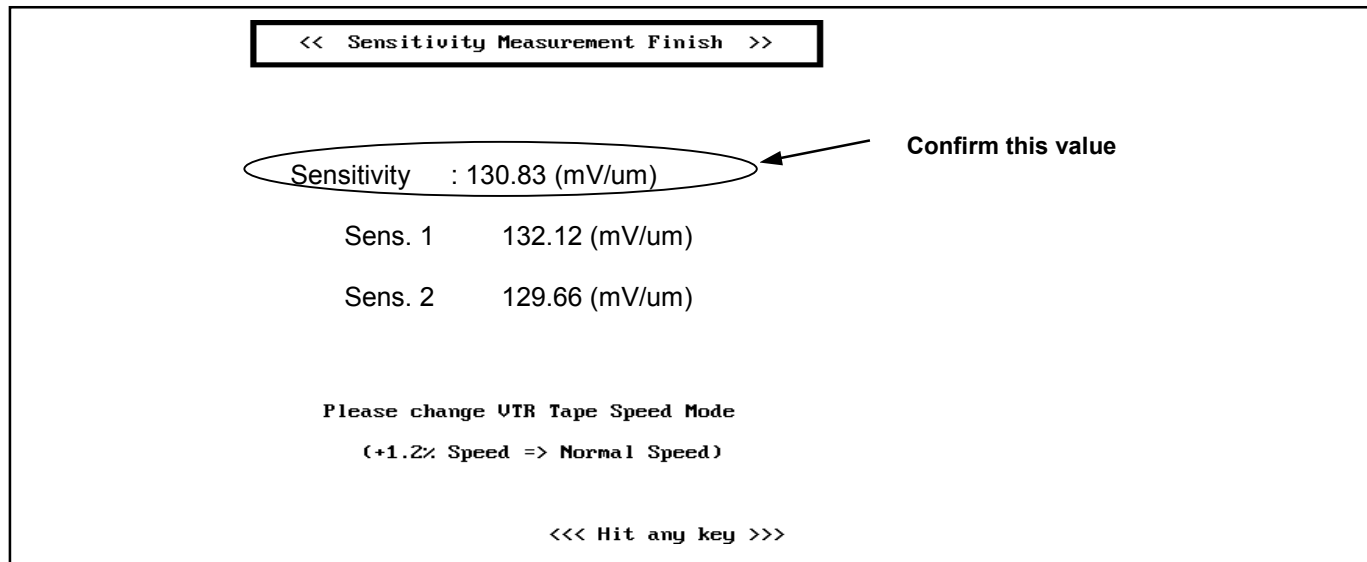


Figure 3-38-4

5. When the picture is appeared as shown in figure 3-38-3, adjust ATF Gain (A18: RPR GAIN DV) so that the "Sens. Value:" meets the specification.
6. After finishing the adjustment, press ESC key to return the Main Menu.
7. Select the Lista Main Menu "(1) Sensitivity Measurement" so that the screen of <ATF Error Signal monitor> appears (refer to 3-38-2).
8. Playback a DV Lista alignment tape and press "Enter" to start the Sensitivity measurement.
9. Confirm that the sensitivity value is within the specification (refer to figure 3-38-4).
10. If it is out of specification, return to item 3.

3-39. Self-REC/PLAY Envelope Waveform Confirmation

SPEC.	All of the head output are within the specification as shown below. Confirm in the 50M mode. · When using the M Cassette (66 min.) or L Cassette (126 min.) $V1/V_{max}, V3/V_{max} \geq 0.7$ $V2/V_{max} \geq 0.8$ · When using the Long Time L Cassette (thin tape) $V1/V_{max}, V2/V_{max}, V3/V_{max} \geq 0.7$ $V4/V_{max} \geq 0.5$		
TEST POINT	R/P – L – ENV R/P – R – ENV PB – L – ENV PB – R – ENV	RF/CUE : TP6302 RF/CUE : TP6502 RF/CUE : TP6302 RF/CUE : TP6502	TRIGGER: R/P-L-HSW TP233: SERVO (F1)
M. EQ.	Oscilloscope		
TAPE	• M Cassette (66 min.) or L Cassette (126 min.) • Long time L Cassette (AJ-5P92LP)		

<Normal Tape : M Cassette (66 min.) or L Cassette (126 min.)>

1. Input the color bar signal to VTR and record it.
2. Playback the just recorded portion, and confirm the envelope output is within the specification. (refer to Figure 3-39-1)

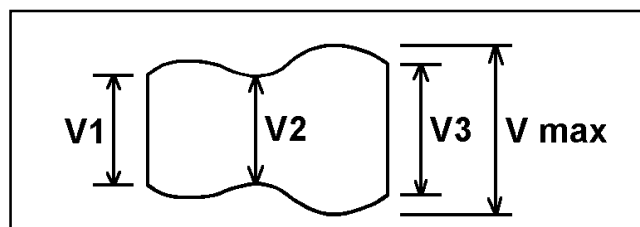


Figure 3-39-1 Envelope Waveform

<Long time L Cassette (this tape) : AJ-5P92LP>

3. Input the color bar signal to VTR and record it.
4. Playback the just recorded portion and confirm the envelope output is within the specification. (refer to figure 3-39-2).
5. If it is out of specification, perform the "ENV Waveform Adjustment" and "LISTA Adjustment" again.

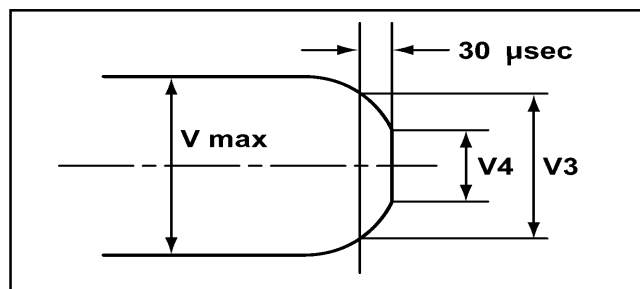


Figure 3-39-2 Exit side of Envelope Waveform
(For Long play cassette)

4. NO TAPE LOADING METHOD

[Procedure]

Service Menu	Selected Item	Loading Procedure	Unloading Procedure
SERVO ADJUST	A09: TENSION	1. Open the "SERVICE MENU". 2. Select the "SEVO MENU". 3. Select "A09: TENSION". 4. Continuously press the SEARCH button.	1. Release the pressing of the "SERCH" button.

5. MAJOR MECHANICAL PARTS REPLACEMENT & ADJUSTMENT PROCEDURES

When mechanical parts are replaced, pay attention to the following notes.

1. Always turn power off before replacing any parts.
2. If any adjustment is required after replacing parts, perform the required adjustment.
3. Use proper tools and fixtures.
4. Be sure to clean the parts after replacement, and also to replace the mechanical parts, following the replacement procedure.

5-1. Cylinder Unit Replacement

(Removal)

1. Remove the T1 Guide and Cleaning Arm Unit. (Please refer to item "5-2. Cleaning Arm Unit Replacement")

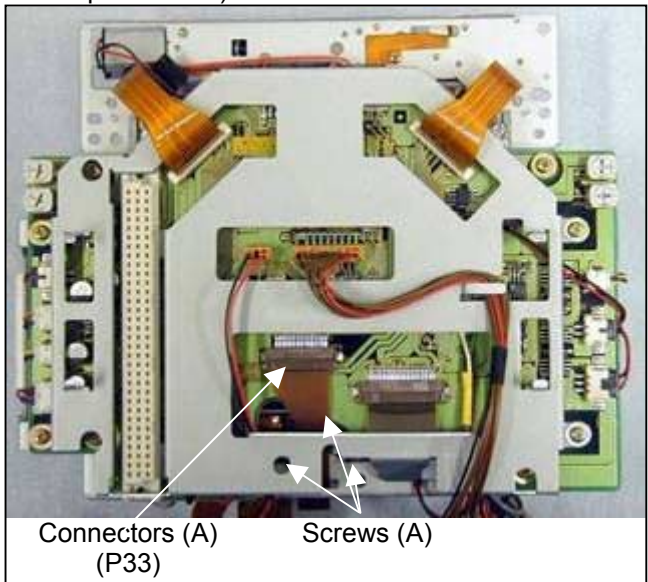


Figure 5-1-1

2. Unscrew the screw (B) which fixes the cable (B) as shown in Figure 5-1-2.
3. Remove the flexible cable which is connected to P33 on the MECH I/F as shown in 5-1-1.
4. Unscrew the 3 screws which has spring from the Cylinder Unit as shown as Figure 5-1-1, then remove the Cylinder Unit without touching any mechanical parts.

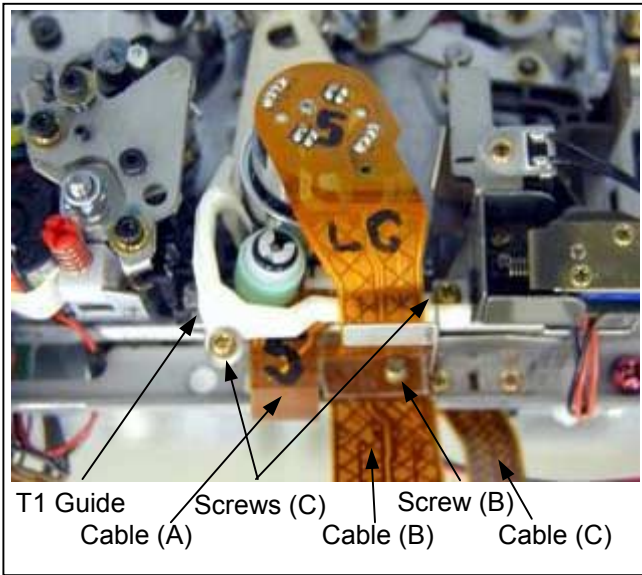


Figure 5-1-2

NOTE:

Don't touch the cylinder by finger directly, when removing the Cylinder Unit.

(Installation)

1. Install the new Cylinder Unit according to the opposite procedures of removing.

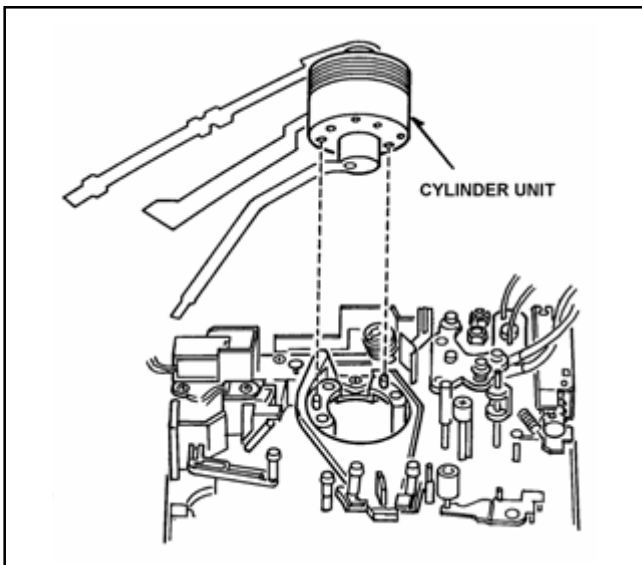


Figure 5-1-3

NOTE:

When installing the Cylinder Unit, the pin on Mech. Chassis should match with holes of Cylinder Unit as shown in Figure 5-1-3.

2. After installing the T1 Guide, T1 Guide Position Adjustment should be performed. (Please refer to item "5-2. Cleaning Arm Unit Replacement" and "5-3. T1 Guide Position Adjustment")

5-2. Cleaning Arm Unit Replacement

(Removal)

1. Unscrew the 2 screws (A) and remove the T1 Guide as shown in Figure 5-2-1.
2. Widen the tip of the cleaner arm, lift up the cleaning arm unit and remove the spring and washer.

(Installation)

1. Install the spring and washer.
2. Insert Cleaning Arm Unit temporary to T2 Arm Unit. Install the spring between Cleaner Base Plate and Cleaning Arm Unit, and insert Cleaner Arm Unit to T2 Arm Unit perfectly.
3. Confirm that the Cleaner Roller rotate when rotate the cylinder by hand while pressing the core of the Cleaner Solenoid.
4. Install the T1 Guide.
5. After installing the T1 Guide, please perform the item "5-3. T1 Guide Position Adjustment".

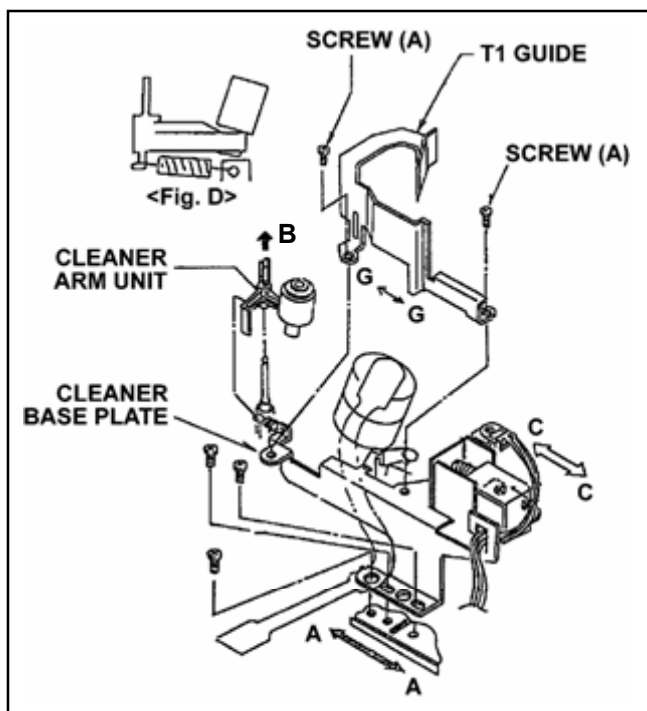


Figure 5-2-1

5-3. T1 Guide Position Adjustment

1. Place the unit to loading condition without the tape.
2. Observe the clearance (B) between T1 Guide and T1 post as shown in Figure 5-3-1, and make sure that it is within 0.2mm to 0.5mm.
3. If not, loosen the 2 screws (A) and adjust the position of the T1 Guide moves to direction of arrow (G \longleftrightarrow G) so that the clearance (B) is within the specification. And tighten the 2 screws (A).

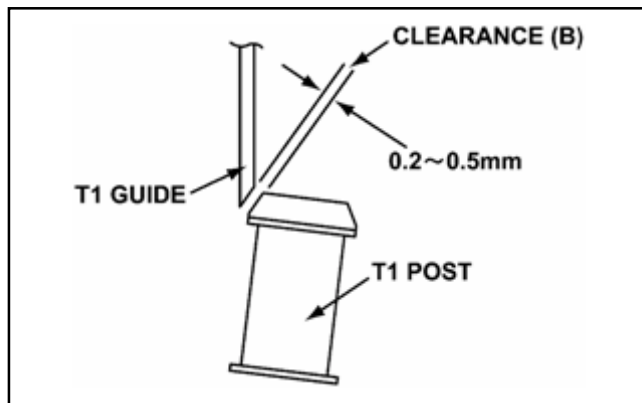
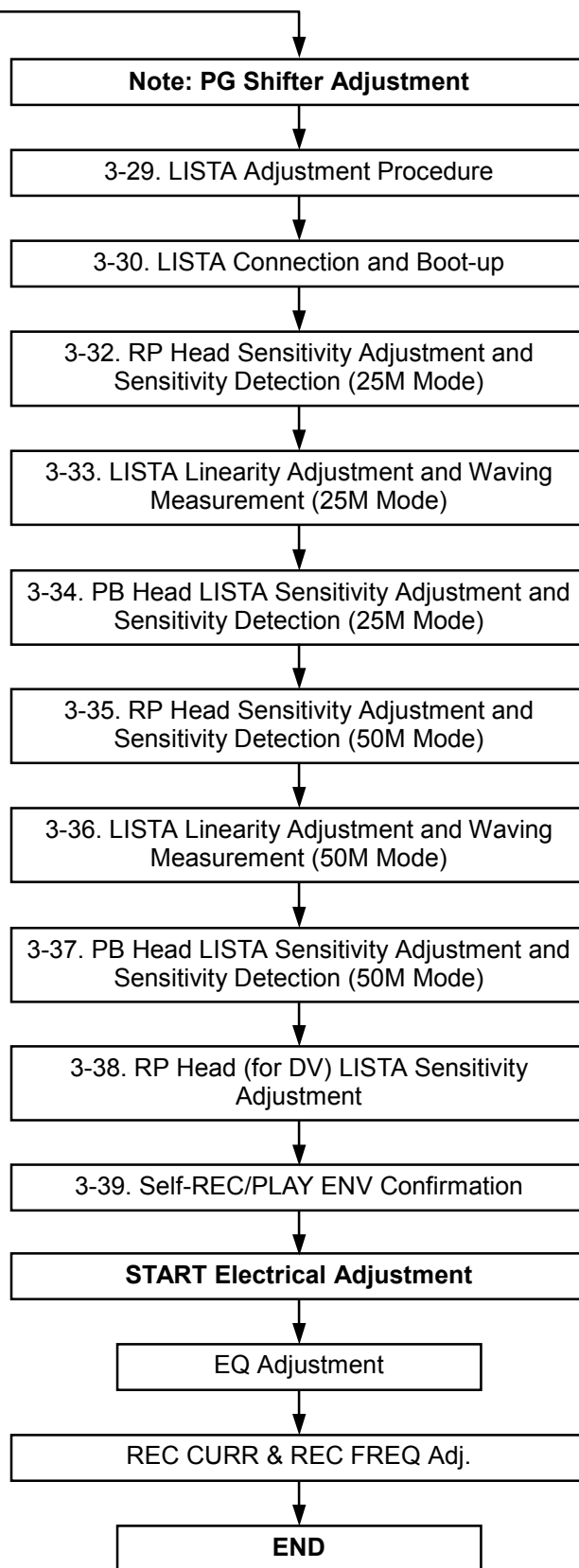
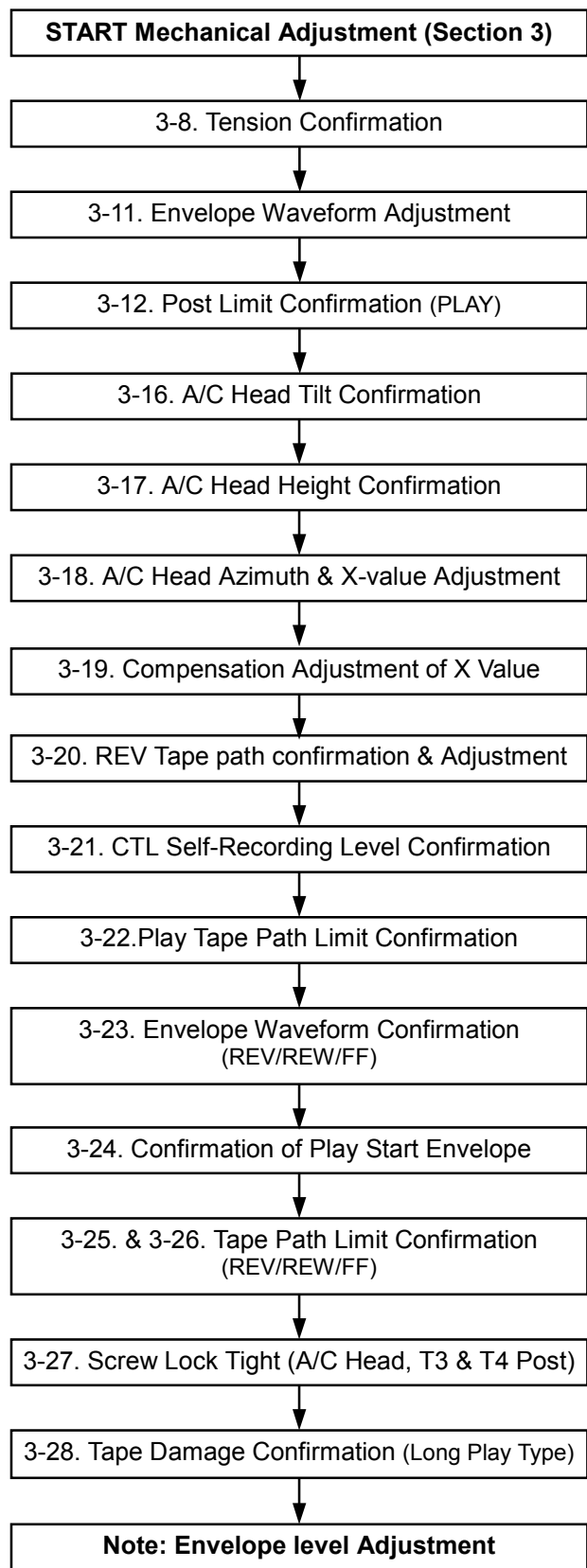


Figure 5-3-1

5-4. Adjustment Flow Chart After Cylinder Unit Replacement

1. After change the Cylinder Unit, please perform the adjustment and confirmation as following flow chart.



NOTE:
Envelope level and PG Shifter adjustment procedure are mentioned on Electrical Adjustment Procedure on Service Manual.

5-5. Supply & Take-up Reel Rotor Unit Replacement

(Removal)

1. Disconnect the **P34** and **P35** on the **MECH I/F**.
2. Move the S1 post to loading direction by manual ejecting method until the screw (C) can be removed as shown in Figure 5-5-1.
3. Confirm the supply and Take Up Brake are not released.
4. Press the iron core of M stopper solenoid to release the M stopper.
5. Remove the 4 screws (C), (D), (E) and (F) as shown in Figure 5-5-1.
6. Remove the Supply and Take Up Reel Rotor Unit and Reel Outer Rail as shown in Figure 5-5-2.

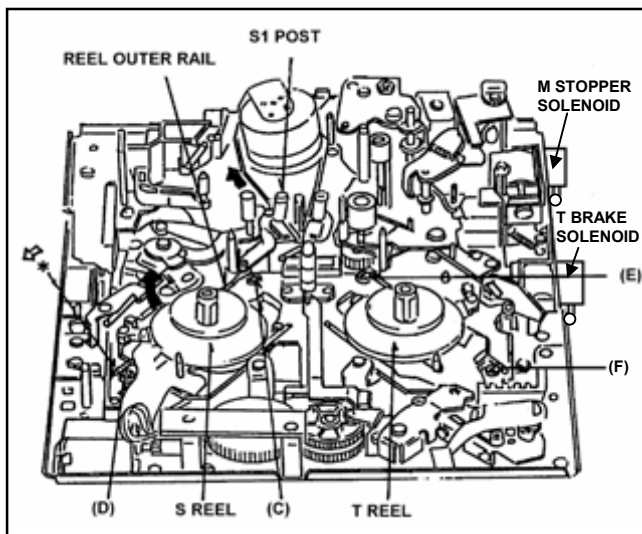


Figure 5-5-1

NOTE:

Confirm the groove position of Reel Base, and then insert the pin of Drive Arm Unit into it.

(Installation)

1. Install the Reel Outer Rail to New Supply and Take Up Reel Rotor Unit.
2. Hang on the Reel Rotor Unit on Reel Inner Rail and Install the Reel Rotor Unit matching the pin of Drive Arm Unit with groove position of Reel Base as shown in Figure 5-5-2.
3. Install the 4 screws (C), (D), (E) and (F).
4. Confirm that the Reel Rotor Unit moves smoothly on the Rail by hand.
5. Move the Reel Rotor Unit to front side by hand and then pull up the iron core of M stopper solenoid so that M stopper operate.
6. Set the unloading condition by turning the Emergency shaft counter-clockwise.
7. Confirm the Main Brake Torque.
8. Connect the Flexible Cable to **P34** and **P35** on the **MECH I/F**.
9. Adjust the S Reel Motor Torque Offset value.
10. Adjust the T Reel Motor Torque Offset value.
11. Confirm the Tension value on playback mode.

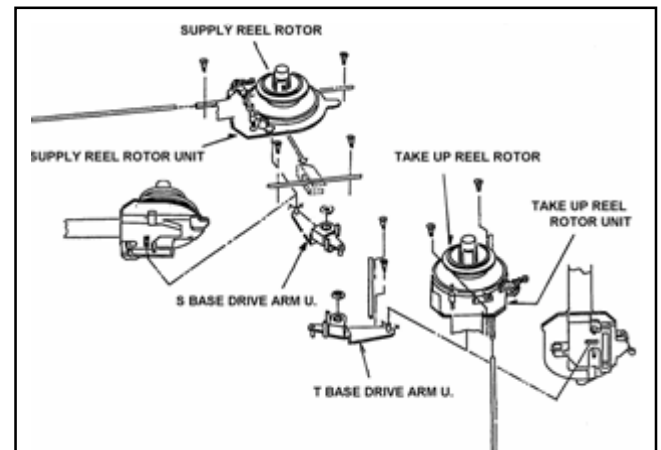


Figure 5-5-2

5-6. Main Brake Torque Confirmation

TEST	S Reel, T Reel
MODE	EJECT (Power OFF)
TOOL	Torque Gauge (VFK71A, VFK1191A) Torque Gauge Adapter (VFK1152)
ADJUSTMENT SPECIFICATION	
Direction A	
0.4±0.2cN·m (40±20g·cm)	
Direction B	
0.2±0.1cN·m (20±10g·cm)	

1. Install the adapter (VFK1152) to the torque gauge (VFK71A).
2. Put the torque gauge on S Reel and turn the torque gauge to direction A until S Reel slips against the brake.
3. Confirm the torque is within the specification.
4. Put the torque gauge on T Reel and turn the torque gauge to direction A until T Reel slips against the brake.
5. Confirm the torque is within the specification.
6. Install the adapter (VFK1152) to the torque gauge (VFK1191A).
7. Put the torque gauge on S Reel and turn the torque gauge to direction B until S Reel slips against brake.
8. Confirm the torque is within the specification.
9. Put the torque gauge on T Reel and turn the torque gauge to direction B until T Reel slips against brake.
10. Confirm the torque is within the specification.

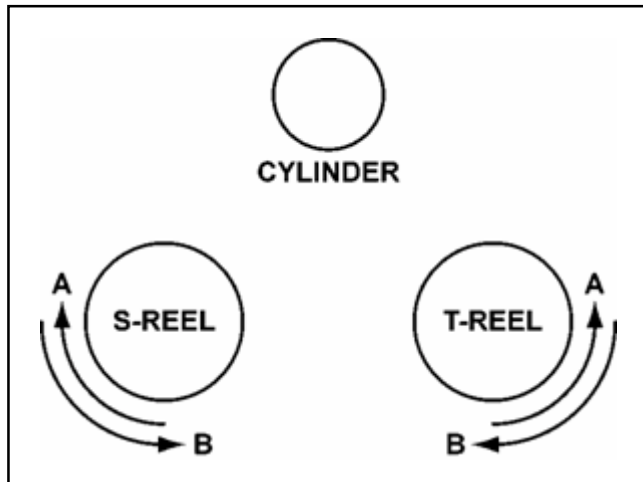


Figure 5-6-1

5-7. Supply & Take-up Brake Arm Unit Replacement

(Removal)

1. Press the iron core of Brake Solenoid to release the Brake.
2. Remove the cut washers (A) and remove the supply and Take Up Brake Arm Unit as shown in Figure 5-7-1.

(Installation)

1. When install the new Brake Arm Unit, hang on the Brake Arm Spring first as shown in Figure 5-7-1.
2. Follow the previous steps in reverse order.
3. Perform the Main Brake Torque confirmation.

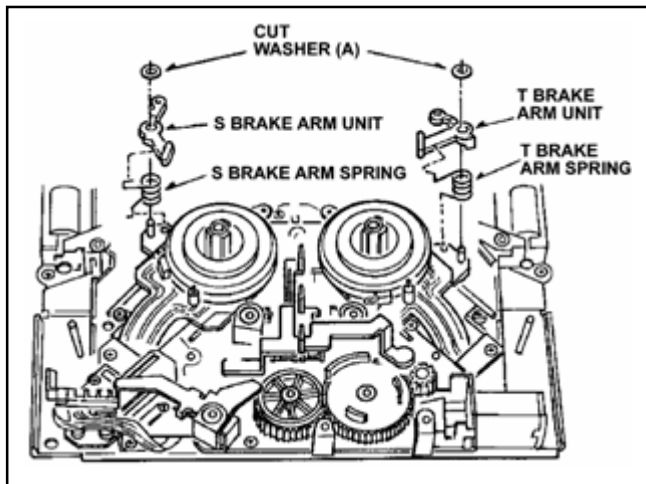


Figure. 5-7-1

5-8. Supply Brake Solenoid Replacement and Adjustment

(Removal)

1. Disconnect the **P15** on the **MECH I/F**.
2. Unscrew the 2 screws (A) and remove the Supply Brake Solenoid Base Unit as shown in Figure 5-8-1.
3. Unscrew the 2 screws (B) and remove the supply Brake Solenoid from Supply Brake Solenoid Base Unit as shown in Figure 5-8-1.

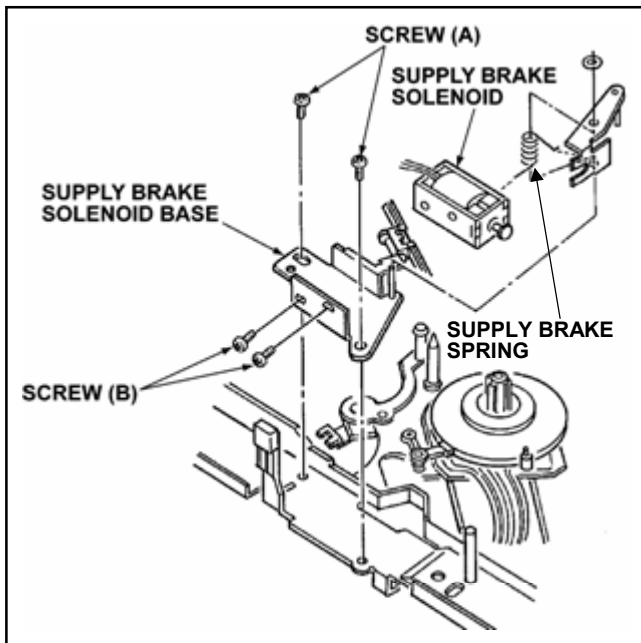


Figure 5-8-1

(Installation)

1. Install the new supply Brake Solenoid following the removal steps in reverse order.

NOTE:

Attach the Brake Arm Spring as shown in Figure 5-8-1.

2. After installing, perform the position adjustment as following procedures.

(Adjustment Procedures)

1. Place the reels in the M cassette size position.
2. Observe the clearance (A) between Brake pad and it's turntable as shown in Figure 5-8-2. And make sure that it is within 0.2 to 0.5mm.
3. If not, loosen the 2 screws (A), which fixed supply and Take Up Brake Solenoid Unit. And adjust the position of Brake Solenoid Unit by moving in the direction of the arrow so that the clearance (A) is within the specification. And tighten the 2 screws (A).
4. After adjustment, change the reel position to S and L cassette size, and confirm that the clearance (A) is within the specification.

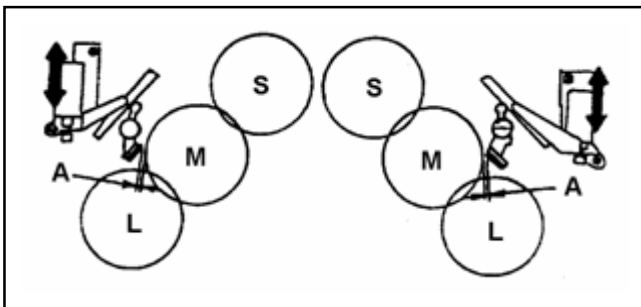


Figure 5-8-2

5-9. Take-up Brake Solenoid Replacement and Adjustment

(Removal)

1. Disconnect the **P18** on the **MECH I/F**.
2. Unscrew the 2 screws (A) and remove the Take Up Brake Solenoid Base Unit as shown in Figure 5-9-1.
3. Unscrew the 2 screws (B) and remove the Take Up Brake Solenoid from Take Up Brake Solenoid Base Unit as shown in Figure 5-9-1.

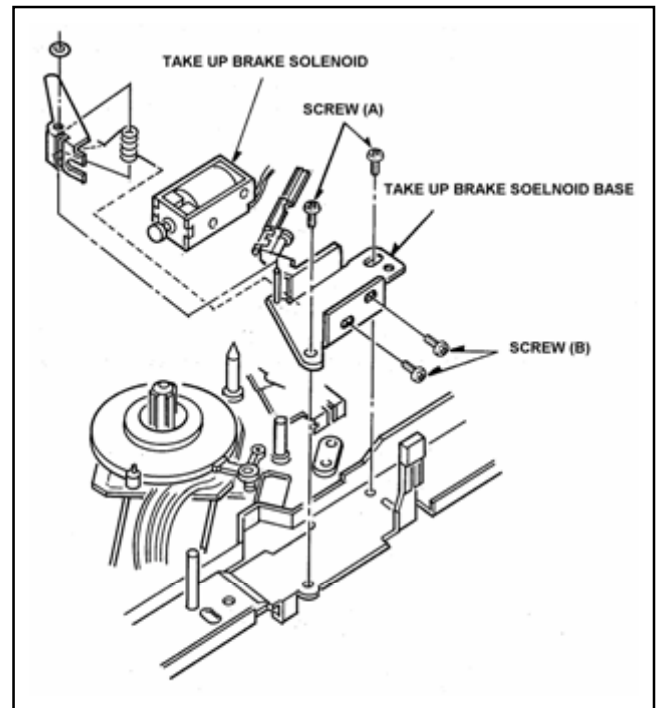


Figure 5-9-1

(Installation)

1. Install the new Take up Brake Solenoid following the removal steps in reverse order.

Note:

Hang on the Take up Brake Spring as shown in Figure 5-9-1.

2. After installation, position adjustment should be performed as follows.

(Adjustment Procedures)

1. Please adjust the position of Take up Brake Solenoid Unit following the adjustment procedure, which is described in item "5-8. Supply Brake Solenoid Replacement and Adjustment".

5-10. Pinch Solenoid Replacement

(Removal)

1. Disconnect the **P20** on the **MECH I/F**.
2. Unscrew the 2 screws (A) and remove the Pinch Solenoid Unit as shown in Figure 5-10-1.
3. Unscrew the 2 screws (B) and remove the Pinch Solenoid Angle as shown in Figure 5-10-1.
4. Unscrew the 2 screws (C) and remove the Pinch Solenoid from the Pinch Solenoid Base.

(Installation)

1. Install the new Pinch Solenoid following the removal steps in reverse order.
2. After installation, perform the Pinch Solenoid Position Adjustment.

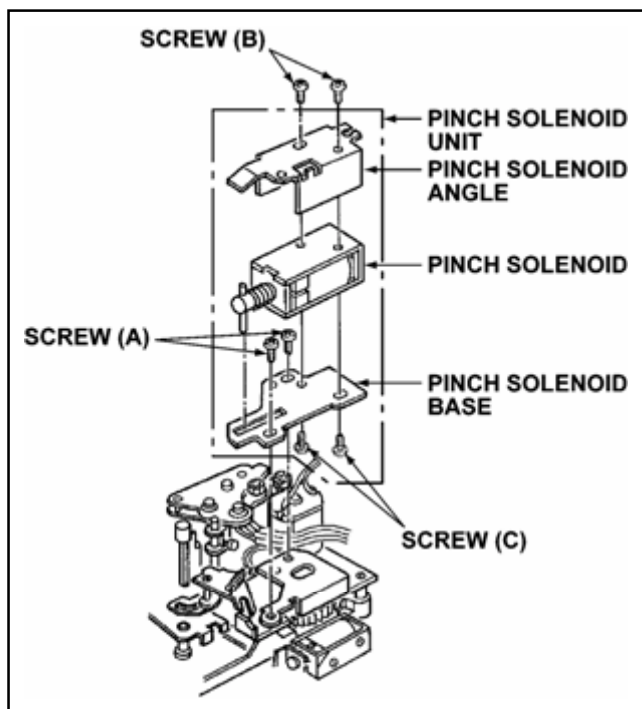


Figure 5-10-1

5-11. Pinch Solenoid Position Adjustment

SPEC.	T = 0.3 mm
TEST	Gap T
ADJUST	Screw (A) and Hole (B)
MODE	EJECT (Power OFF)
TOOL	Eccentric Driver (VFK0357)

1. Confirm the power is turned off.
2. Push the pinch roller by hand to be close to capstan.
3. Push the pinch solenoid by hand so that the pinch roller contacts capstan.
4. Loosen the two screws (A) and adjust the hole (B) by VFK0357 so that gap (T) is within the specification.

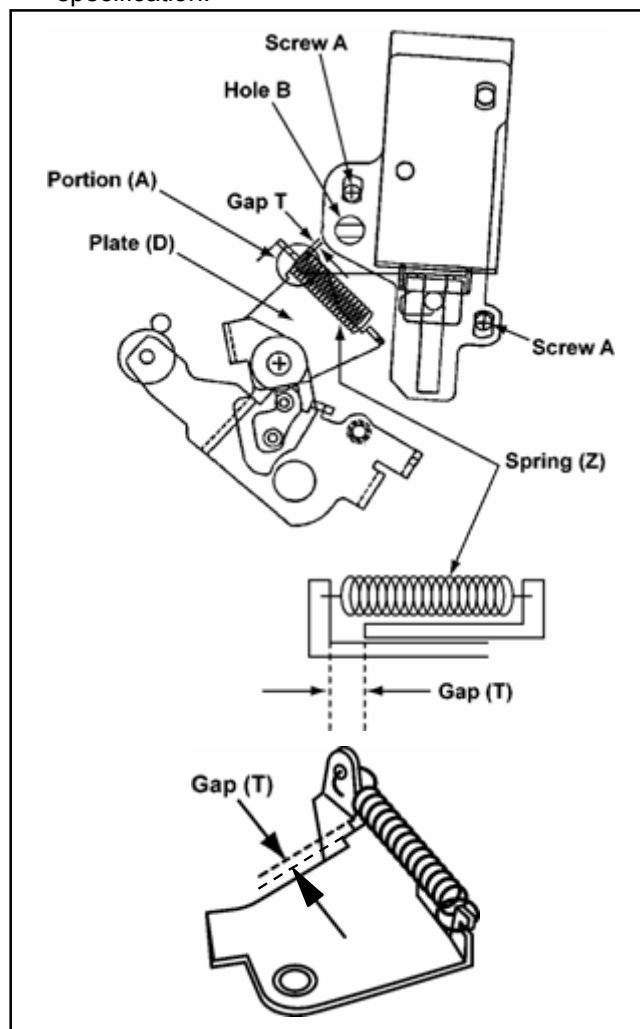


Figure 5-11-1

5-12. Pinch Arm Unit Replacement

(Removal)

1. Refer to item "5-10.Pinch Solenoid Replacement" to remove the Pinch Solenoid Unit.
2. Remove the cut washer (A) and remove the Pinch Solenoid Lever as shown in Figure 5-12-1.
3. Remove the cut washer (B) and remove the Pinch Arm Unit as shown in Figure 5-12-1.

(Installation)

1. Install the new Pinch Arm Unit following the removal steps in reverse order, and then Pinch Solenoid Position Adjustment is necessary.

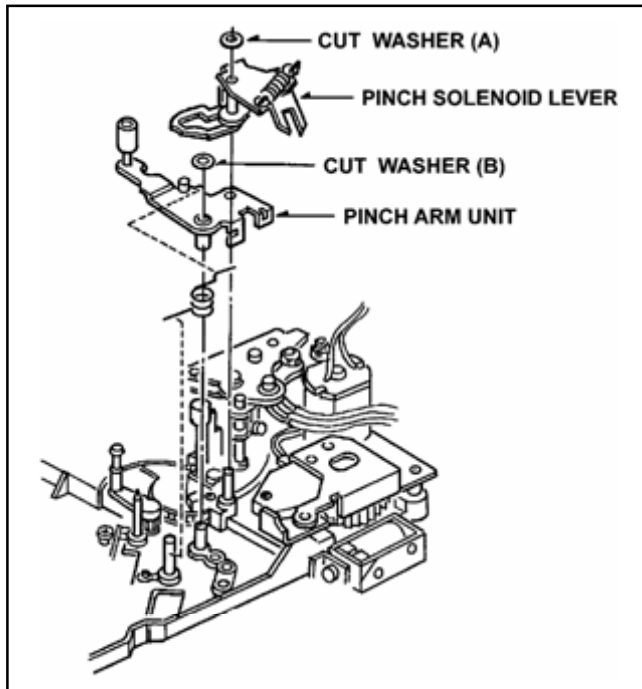


Figure 5-12-1

5-13. Loading Motor Replacement

(Removal)

1. Disconnect the **P21** on the **MECH I/F**.
2. Remove the Pinch Solenoid Unit. (Refer to item 5-10).
3. Unscrew the screw (B), and remove the Emergency Shaft as shown in Figure 5-13-1.
4. Unscrew the 2 screws (C) and remove the Loading Motor Neutral Unit as shown in Figure 5-13-1.
5. Unscrew the 2 screws (D) and remove the Loading Motor Unit as shown in Figure 5-13-1.

(Installation)

1. Install the new Loading Motor Unit to Loading Motor Neutral Unit by tightening 2 screws (D).
2. Install the Loading Motor Neutral Unit by tightening the 2 screws (C), paying attention to the pin of Mode SW Unit which should match with groove position of main Cam Gear.
3. Install the Emergency Shaft by tightening the screw (B).
4. Install the Pinch Solenoid Unit. After installation, the Pinch Solenoid Position adjustment is required. (Refer to item 5-11-1).
5. Connect the **P21** to the **MECH I/F**.

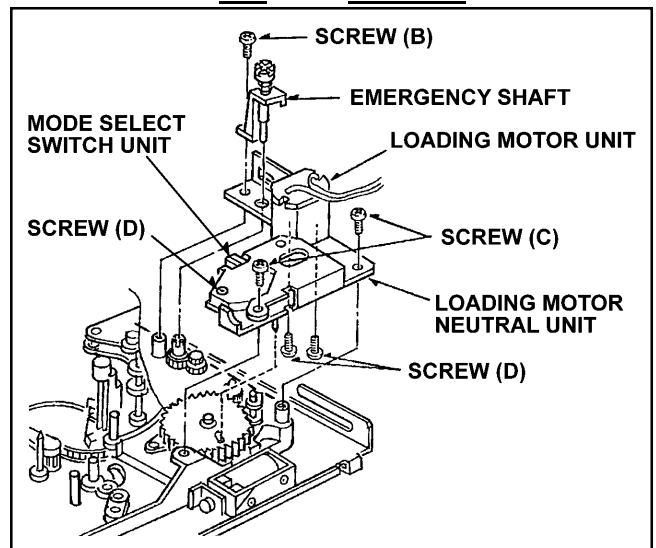


Figure 5-13-1

5-14. Mode SW Unit Replacement

(Removal)

1. Disconnect the **P22** on the **MECH I/F**.
2. Remove the Pinch Solenoid Unit and Loading Motor Unit. (Refer to item 5-10 and 5-13.)
3. Remove the screw (E) and remove the Mode Select Switch Unit from Loading Motor Unit as shown in Figure 5-14-1.

Note:

Pay attention to the pin of Mode Switch Unit which should match with groove of Main Cam Gear.

(Installation)

1. Install the New Mode Select Switch Unit following the removal steps in reverse order (Refer to item "5-13. Loading Motor Replacement").
2. After installing the Pinch Solenoid Unit, Pinch Solenoid Position adjustment is required. (Refer to item 5-11).

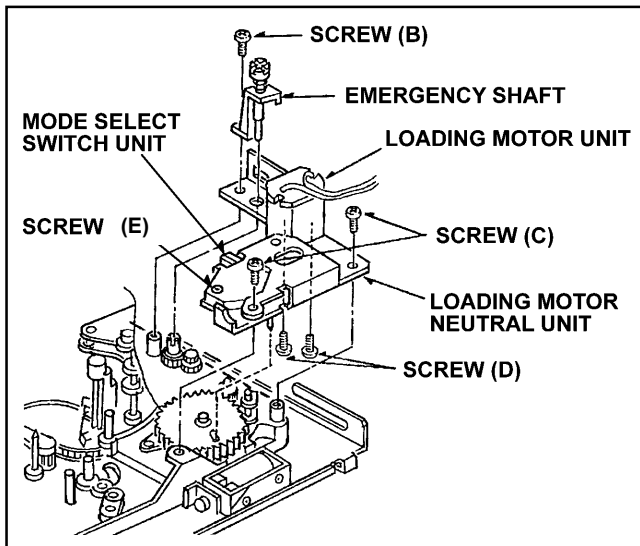


Figure 5-14-1

5-15. Main Cam Gear Replacement

(Removal)

1. Remove the Pinch Solenoid Unit and Loading Motor Unit. (Refer to item 5-10 and 5-13.)
2. Remove the Main Cam Gear as shown in Figure 5-15-1.

(Installation)

1. Install the Main Cam Gear, then the pin of Main Cam Arm Unit (*) should match with the groove position of Main Cam Gear as shown in Figure 5-15-1.
2. Follow the removal steps in reverse order.
3. After installation, perform the Pinch Solenoid Position Adjustment. (Refer to item 5-11)

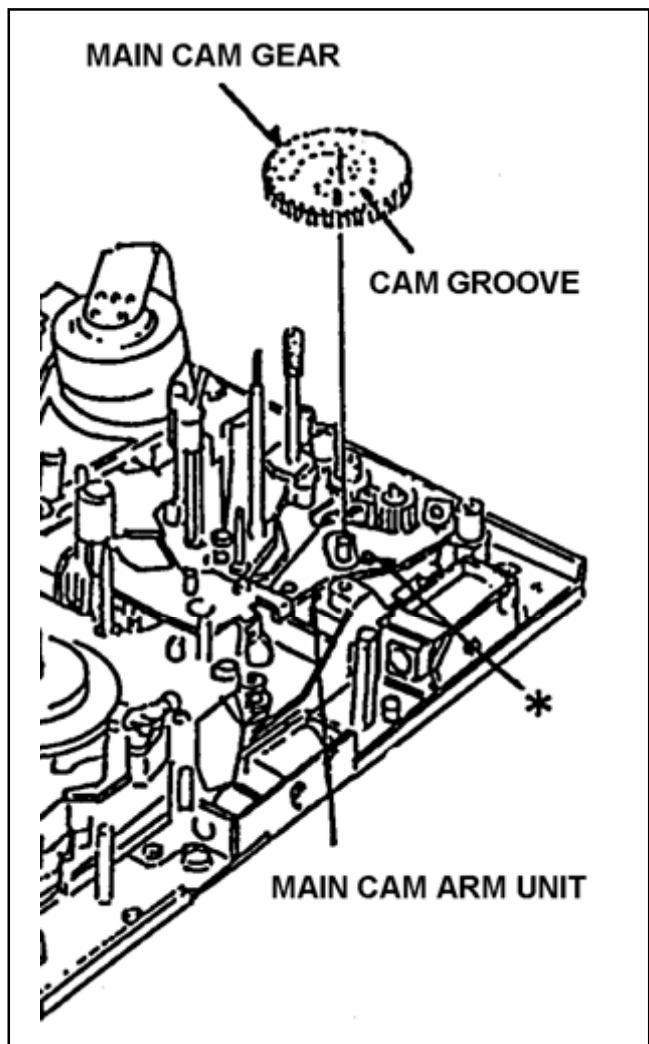


Figure 5-15-1

5-16. Thrust Screw Replacement and Adjustment

1. Remove the Thrust Adjustment Screw.
2. Clean the capstan shaft with an applicator.
3. Put oil (VFK0906) on a new Thrust Adjustment Screw and install it to the upper end of the Capstan Housing.
4. Turn the Thrust Adjustment Screw slowly clockwise until the Capstan Rotor just starts turning (separate from the Capstan Rotor).
5. Turn the Thrust Adjustment Screw further from that point (the point Capstan Rotor just starts turning) about 225 degrees clockwise as shown in Figure 5-16-2.
6. Put the glue (Ex. : Three Bond 1401B) on the Thrust Adjustment Screw.
7. Confirm that the Oil Seal does not leak on the Capstan Housing as shown in Figure 5-16-1.

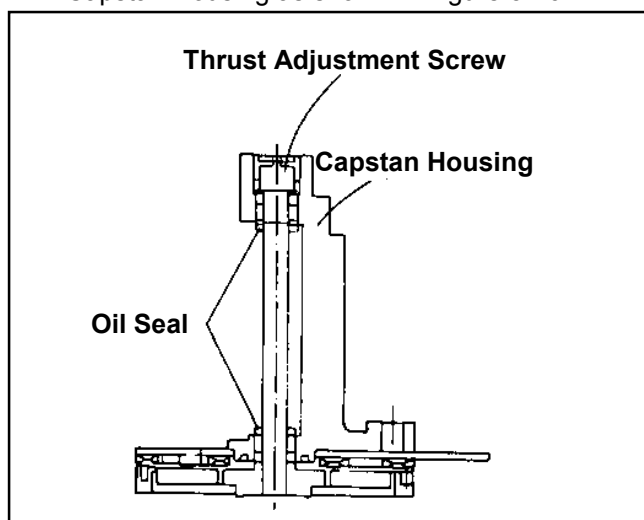


Figure 5-16-1

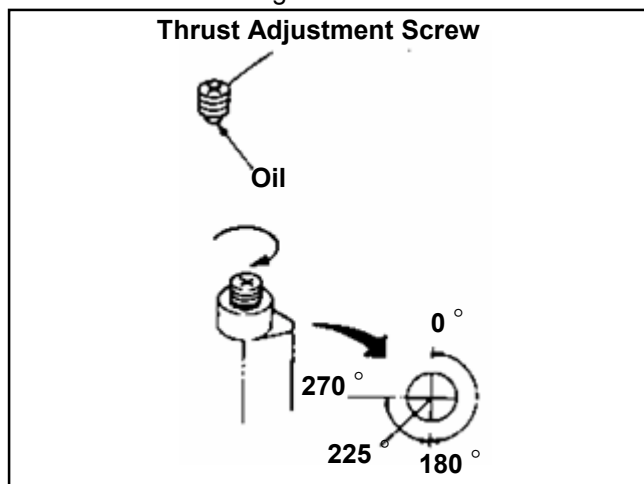


Figure 5-16-2

5-17. S5 Post Base Unit Replacement

(Removal)

1. Unscrew the screw (A) and remove the S5 Post Base Unit as shown in Figure 5-17-1.

(Installation)

1. Install the S5 post Base Unit following the removal steps in reverse order.

Note: Be careful the S5 Post Base Unit is installed to mech. chassis as shown in Figure 5-17-1.

2. After installation, Post Height Pre-Adjustment and Tape path Adjustment should be performed.

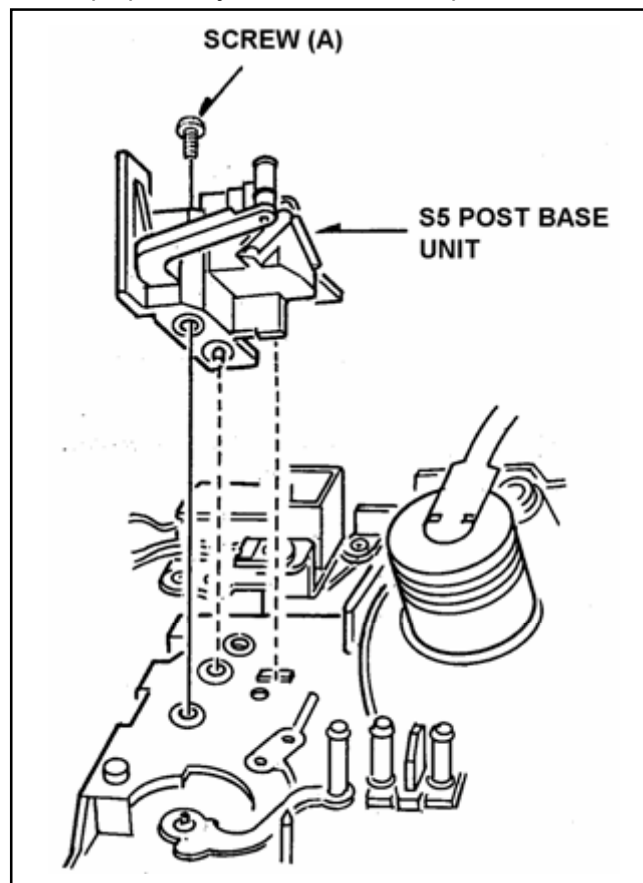


Figure 5-17-1

5-18. Tension Arm Unit Replacement

(Removal)

1. Remove the Cut Washer (A) and detach the Tension Regulator Spring, and then remove the Tension Arm Unit as shown in Figure 5-18-1.

(Installation)

1. Install the new Tension Arm Unit following the removal steps in reverse order.
2. After installation, Tension Arm Adjustment steps should be performed the following.

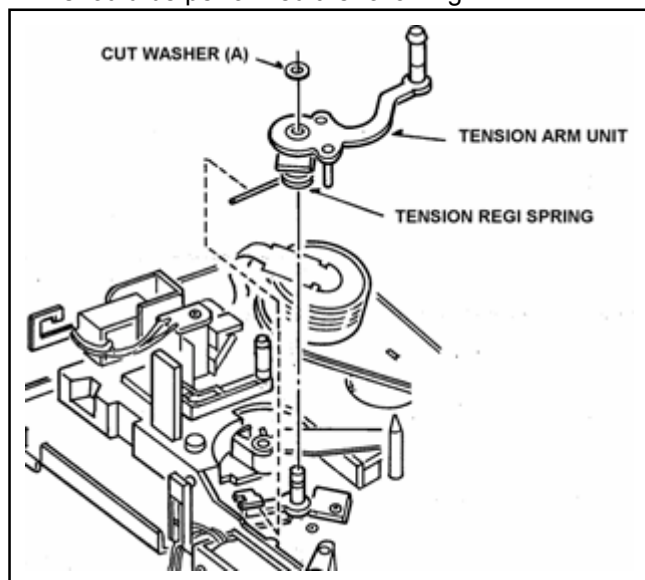


Figure 5-18-1

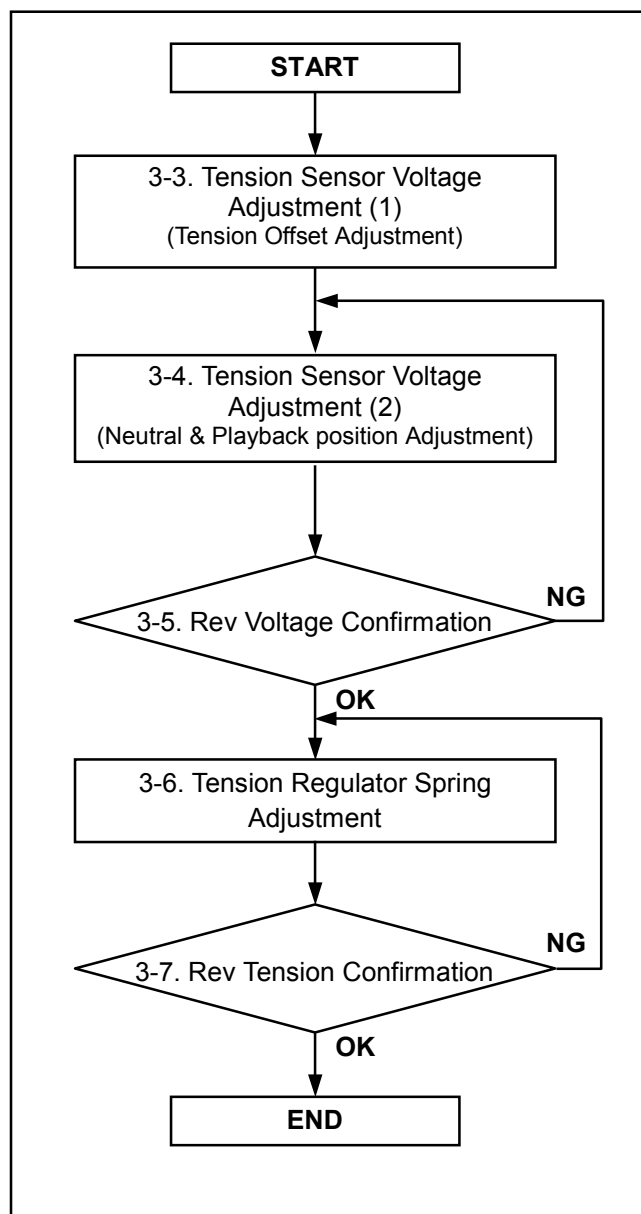


Figure 5-18-2

5-19. S1 Post Loading Arm Unit Replacement & Adjustment

(Removal)

1. Remove the S5 Post Base Unit. (Refer to item 5-17)
2. Remove the Tension Arm Unit. (Refer to item 5-18).
3. Unscrew the screw (A) and remove the S1 Post from Loading Rail as shown in Figure 5-19-1.
4. Remove the Cut Washer (B) and remove the S1 Loading Arm Unit as shown in Figure 5-19-1.

(Installation)

1. Install the new S1 Loading Arm Unit following the removal steps in reverse order, and then S1 Post Loading Arm Unit Phase Adjustment should be performed as follows.
2. After installation, confirm that the S1 Post move smoothly on the Loading Rail.
3. Tension Arm and Tape path Adjustment should be performed.

(Adjustment)

Install and adjust so that the Hole (A) is parallel with Hole (B) as shown in Figure 5-19-1.

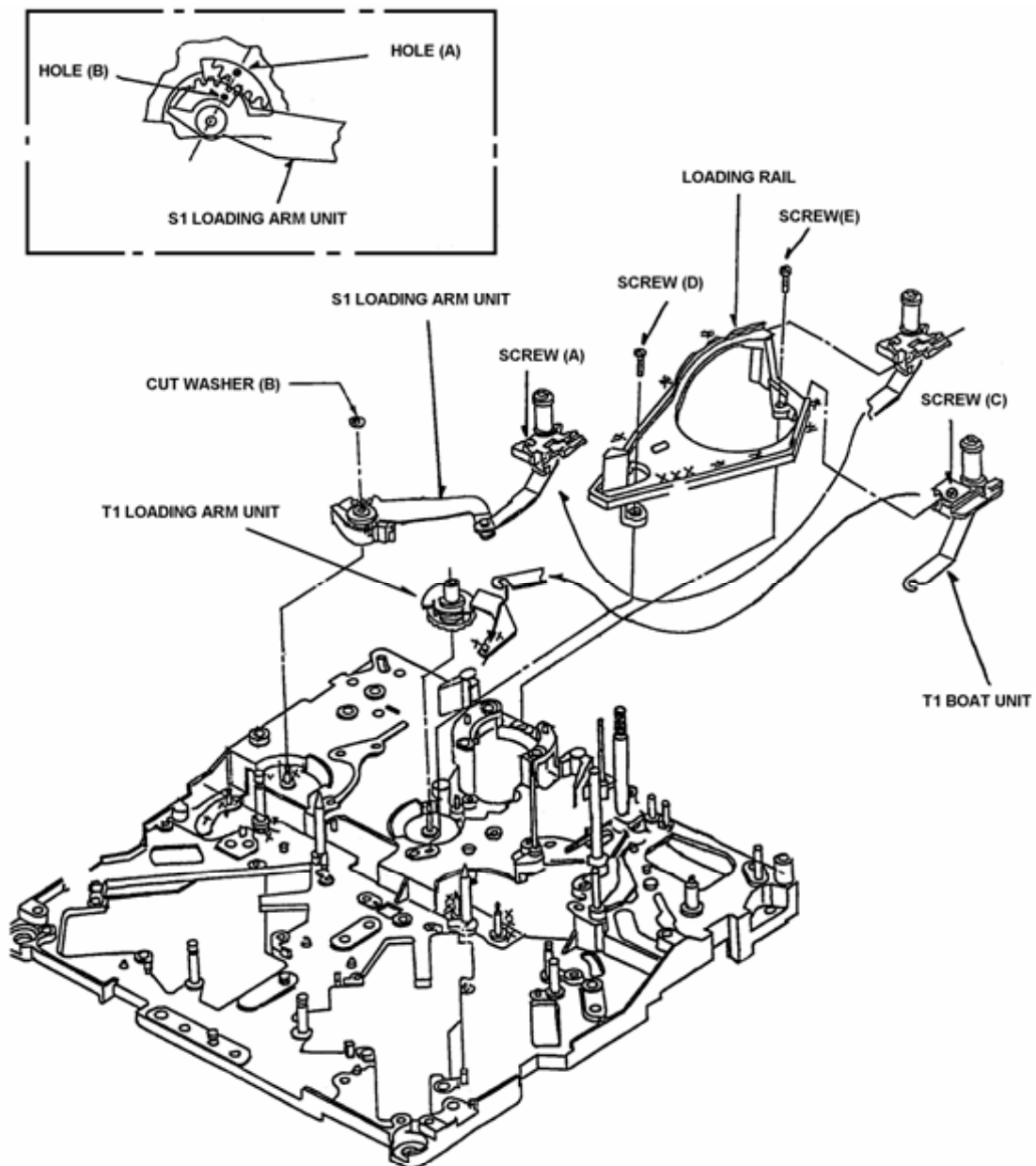


Figure 5-19-1

5-20. T1 Boat Unit Replacement and Adjustment

(Removal)

1. Unscrew the screw (C) and remove the T1 Post from Loading Rail as shown in Figure 5-19-1 on the previous page.
2. Hang off the T1 Boat Unit from T1 Loading Arm Unit as shown in Figure 5-19-1.

(Installation)

1. Install the new T1 Boat Unit follow the removal steps in reverse order.
2. After installation, confirm that the T1 Post moves smoothly on the Loading Rail.
3. Tape path Adjustment should be performed.

(Know how for Replacing T1 boat)

(1) T1 boat replacing procedure

Fix the T1 boat flat to the T loading arm N ass'y not to bend the both parts.

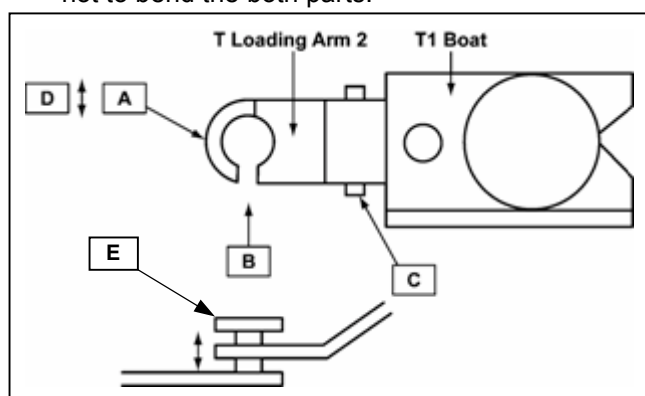


Figure 5-20-1

- If the portion A shown in the figure above is deformed, the T1 boat can cause snag during loading or significant change in X-Value. Visually check the portion A doesn't have the deformation.
- If deformation is found, remove the T1 boat, flatten the arm by using an appropriate tool such as a pair of long nose pliers and then install the T1 boat. Or, replace the T1 boat with a new one.
- If the portion B shown in the figure above is significantly deformed, the arm can become loose. At a half load position, while pinching the portion C of the arm with tweezers, slightly move the arm in the directions of D several times and make sure that the arm does not come off. If it can come off, remove the T1 boat. Using long nose pliers, narrow the opening B and then fit the T1 boat.

(Confirmation and Adjustment Procedure)

Tool : T Arm Height Adj. Tool A (VFK1542)

T Arm Height Adj. Tool B (VFK1543)

(1) T1 boat replacing procedure

1. Turn the emergency red screw clockwise and set T1 Boat Unit to the position which the point (A), (B) and (C) in Figure 5-20-2 be on the same line.
2. Push the Pinch Roller by hand to be close to Capstan and push the Pinch Solenoid by hand so that the Pinch Roller contacts Capstan.
3. Set the T Arm Height Adj. Tool A (VFK1452) to take up side cassette fixed pin as shown in figure 5-20-3.
4. Turn the Tool A and confirm that the Tool A contacts to pin E (the position of pin E as shown in figure 5-20-1) as shown in figure 5-20-3.
5. Set the T Arm Height Adj. Tool B (VFK1543) to take up side cassette fixed pin as shown in figure 5-20-3.
6. Turn the Tool B and confirm that the Tool B does not contact to pin E (the position of pin E as shown in figure 5-20-1) as shown in figure 5-20-3.

<Specification of T Arm Height>

	Contact of Pin E
Tool A (have cut)	contact
Tool B (have not cut)	no contact

Note 1: In case Tool A does not contact to Pin E.

1. Remove the T1 Boat Unit from Loading Rail and press up the T Loading Arm 1 by hand to change the height of T Loading Arm.
2. Install the T1 Boat Unit and hit the Pin E from the top lightly.
3. Repeat the T1 Loading Arm Height Adjustment.

Note 2: In case Tool B contact to Pin E.

1. Remove the T1 Boat Unit from Loading Rail and press down the T Loading Arm 1 by hand to change the height of T Loading Arm.
2. Install the T1 Boat Unit and hit the Pin E from the top lightly.
3. Repeat the T1 Loading Arm Height Adjustment.

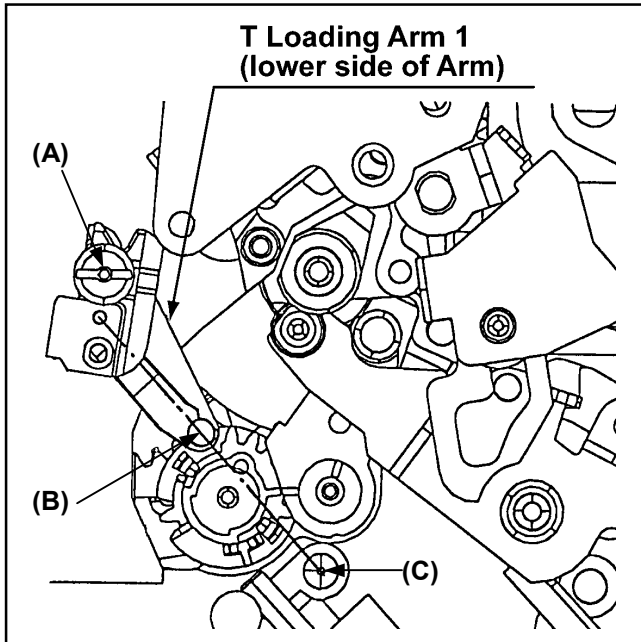


Figure 5-20-2

(2) Check the smooth movement of T1 Boat Unit.

Check smooth loading and unloading operations. If not smooth (especially, at the curve of rail), take the following steps.

1. Check deformation of T1 boat joint.
2. If no deformation, then reposition the loading rail as described below.

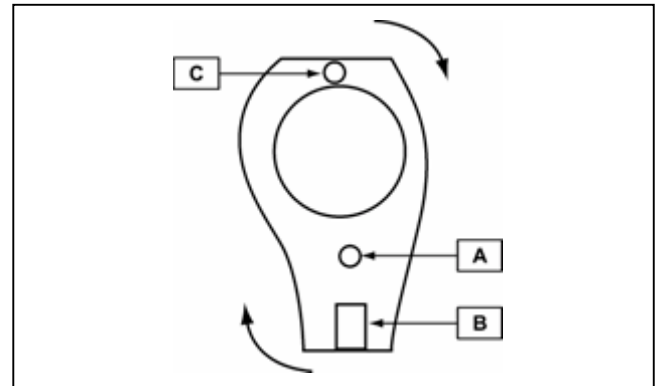


Figure 5-20-4

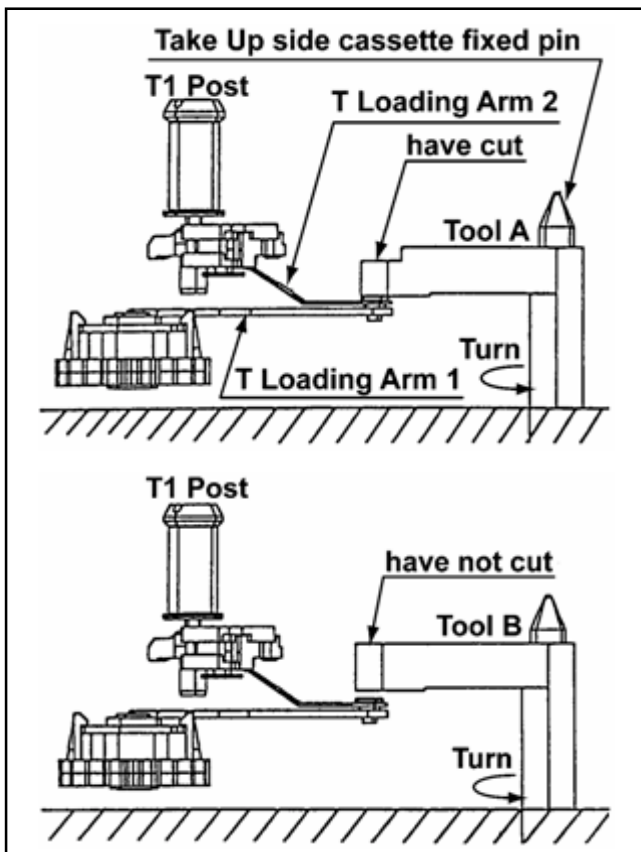


Figure 5-20-3

1. Loosen the screw A.
2. While pressing the projection B leftward, tighten the screw.

If loading & unloading operation still is not smooth, remove CYL and loosen screws A and C. Turn the rail clockwise as shown in the figure and then tighten the screws.

If the operation still is not smooth, replace loading rail or the T1 boat with a new one.

5-21. A/C head Replacement & Adjustment

<Tools required>

Nut Driver (5.5mm : VFK1150)
Hex Driver (VFK1148)
Hex Wrench (VFK1190)

Point: Memorize height of the Nut (C) before remove the Nut (C).

(Removal)

1. Loosen the hex screw (B) and remove the Nut (C). Detach the Head Height Adjustment Spring and then remove the A/C Head Unit as shown in Figure 5-21-1.

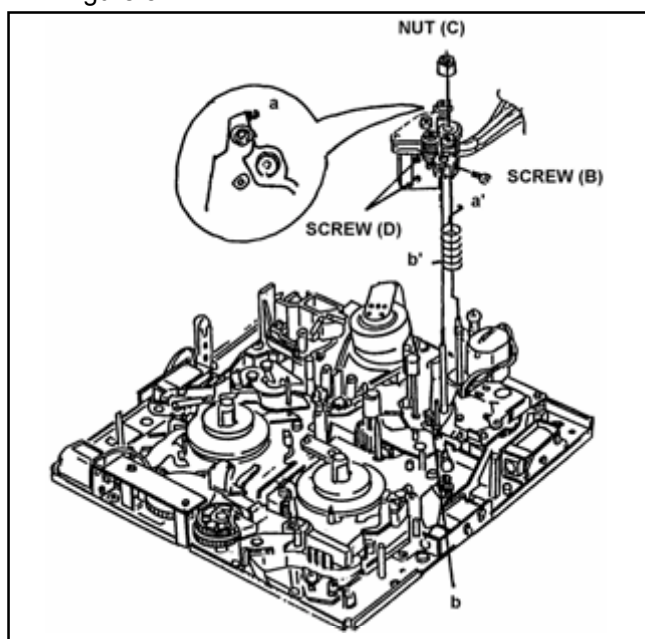


Figure 5-21-1

2. Remove the 2 screws (A) and disconnect the **P4001** on the **RF/CUE P.C.B.** and **P30** on the **MECH I/F**, and then remove the A/C Head from the A/C Head Plate as shown in Figure 5-21-2.

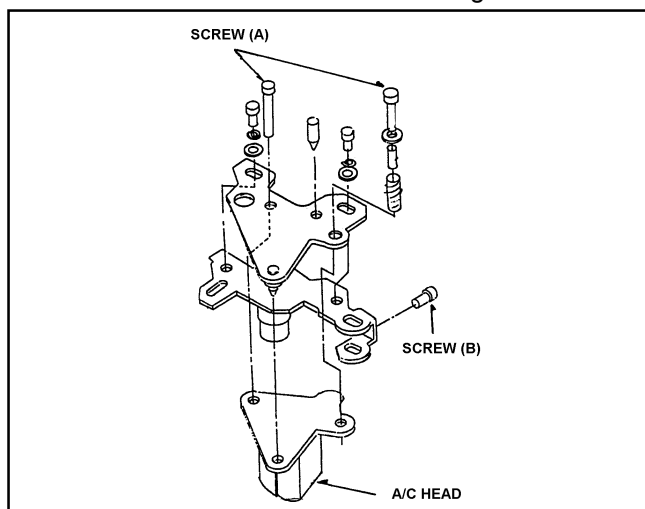


Figure 5-21-2

3. Remove the Shield Cover by removing 2 screws (D) in Figure 5-21-1.
4. Unsolder the lead wires as shown in Figure 5-21-3. (When unsoldering the lead wires, do not unsolder all at the same time)

(Installation)

1. Remove the Shield Case from the New A/C Head and solder the lead wires to New A/C Head. (Refer to Figure 5-21-3)
2. Reinstall the shield case to A/C Head.
3. Install the A/C Head to A/C Head Plate by tightening 2 screws (A), then set the gap parallel between A/C Head and A/C Head Plate.
4. Install the A/C Head Unit.
5. Attach the Head Height Adjustment Spring and tighten the Nut (C).
6. Clean the surface of the A/C Head.

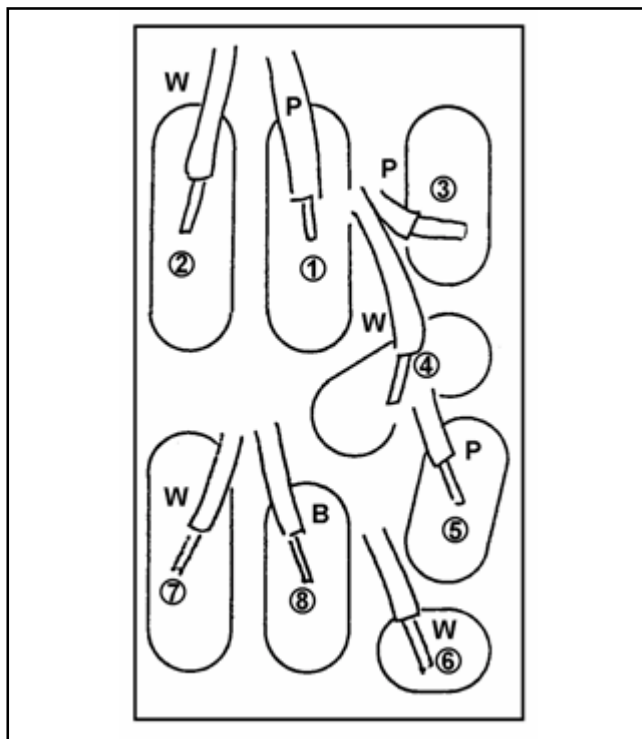
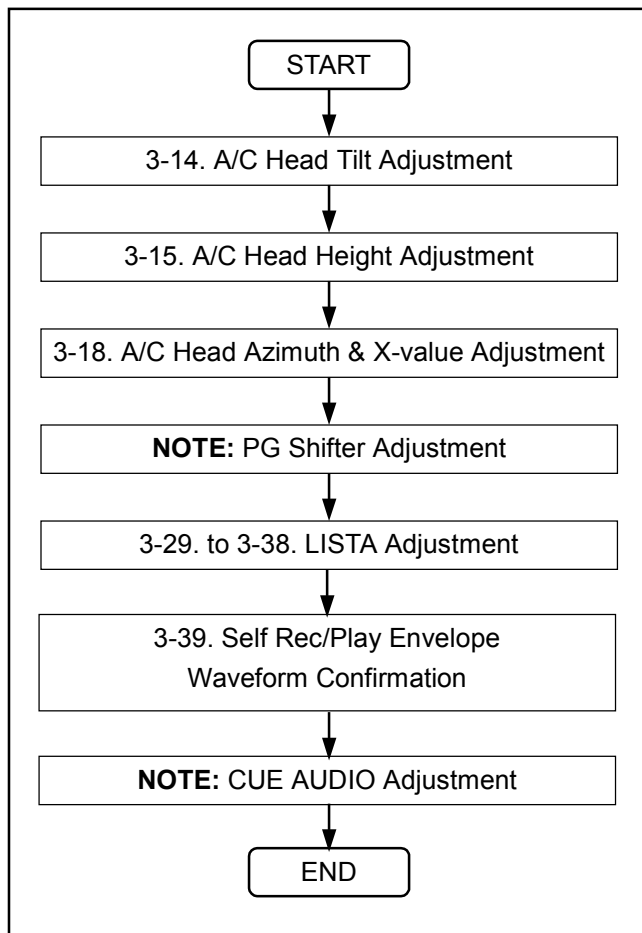


Figure 5-21-3

A/C Head	Cable Color		Connector
1	Pink	Yellow	P4001
2	White		
3	Pink	Red	
4	White		
5	Pink	Green	P30
6	White		
7	White	Yellow	
8	Black		

<A/C Head Adjustment>

1. After changing the A/C Head, please perform the following steps.



NOTE:
PG Shifter and CUE AUDIO adjustment procedures are mentioned on Electrical Adjustment Procedures on Service Manual.

5-22. Cleaner Solenoid Replacement & Adjustment

(Removal)

1. Disconnect the **P48** on the **MECH I/F**.
2. Unscrew the 2 screws (A) and remove the Cleaner Solenoid Unit as shown in Figure 5-22-1.
3. Unscrew the 2 screws (B) and remove the Cleaner Solenoid as shown in Figure 5-22-1.

(Installation)

1. Install the new Cleaner Solenoid following the removal steps in reverse order.
2. After installation, perform the Cleaner Solenoid Position adjustment.

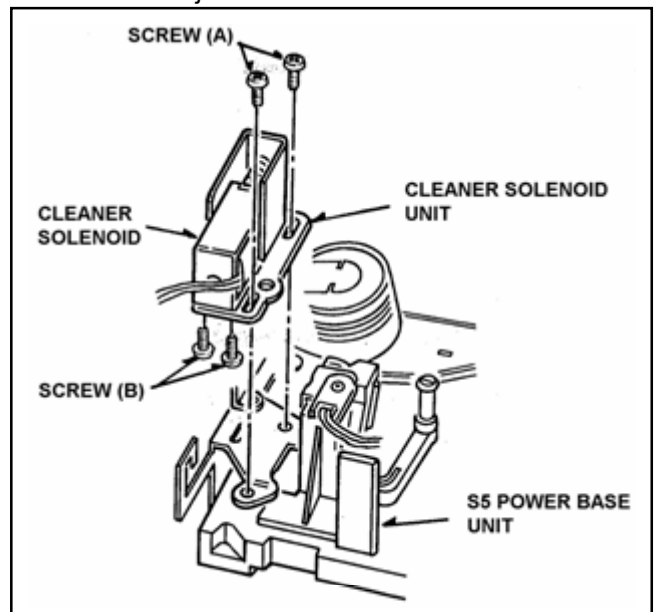


Figure 5-22-1

5-22-1. Cleaner Solenoid Position Adjustment

<Tools required>

Eccentric Driver (VFK0357)

1. Press the iron core of Cleaner Solenoid.
2. Observe the clearance (D) between Cleaning Arm Unit and Cleaner Base Plate as shown in Figure 5-22-3. And make sure that it is within 0.5 to 0.7mm.
3. If not, loosen the 2 screws (A) and adjust the position of Cleaner Solenoid Unit by moving arrow direction (C \longleftrightarrow C) using the Eccentric drive so that the clearance (D) is within the specification. And tighten the 2 screws.
4. After adjustment, confirm as follows.
5. Press the iron core of Cleaner Solenoid and released it, then the Cleaning Roller return to original position.
6. Press the iron core of the Cleaner Solenoid and confirm that the Cleaner Roller rotates, when the Cylinder is rotated by hand.

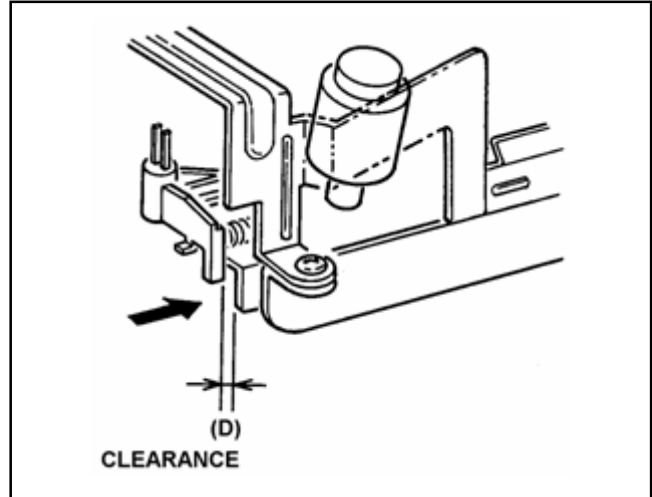


Figure 5-22-3

Note:

If the cleaner Base Plate is removed, execute the Cleaner roller Position adjustment.

5-22-2. Cleaner Roller Position Adjustment

<Tools required>

Eccentric Driver (VFK0357)

1. Observe the clearance (A) between Cleaner Roller and cylinder Unit as shown in Figure 5-22-4. And make sure that it is within 1.0 to 1.2mm.
2. If not, loosen the 2 screws (B) as shown in figure 5-22-2 and adjust the position of Cleaner Base Plate by moving arrow direction (A \longleftrightarrow A) using the Eccentric driver so that the clearance (A) is within the specification. And tighten the 2 screws (B).

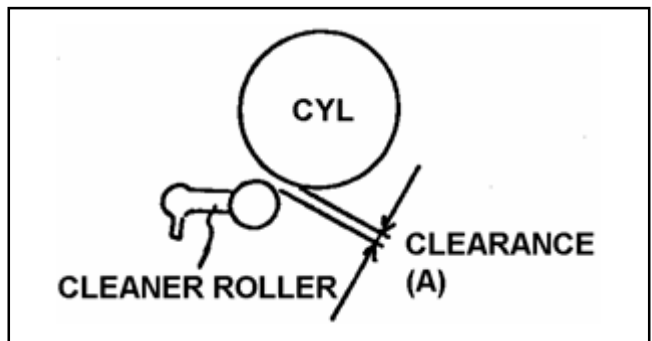


Figure 5-22-4

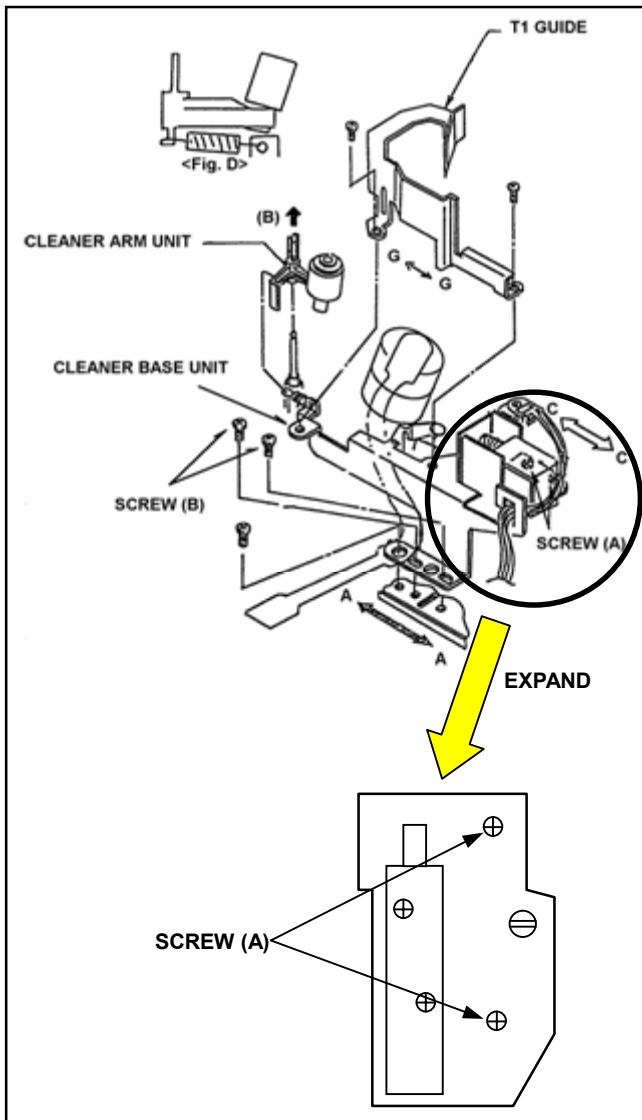


Figure 5-22-2

5-23. Distinction SW Unit Replacement

(Removal)

1. Disconnect the **P17** on the **MECH I/F**.
2. Remove the MIC Drive Rev Spring at Distinction Switch Unit side as shown in Figure 5-23-1.
3. Unscrew the 3 screws (A) and remove the MIC Rail Unit as shown in Figure 5-23-1.

(Installation)

1. Install the new Distinction Switch Unit following the removal steps in reverse order.
2. Confirm that the M and L cassettes touch to Distinction Switch Unit correctly.

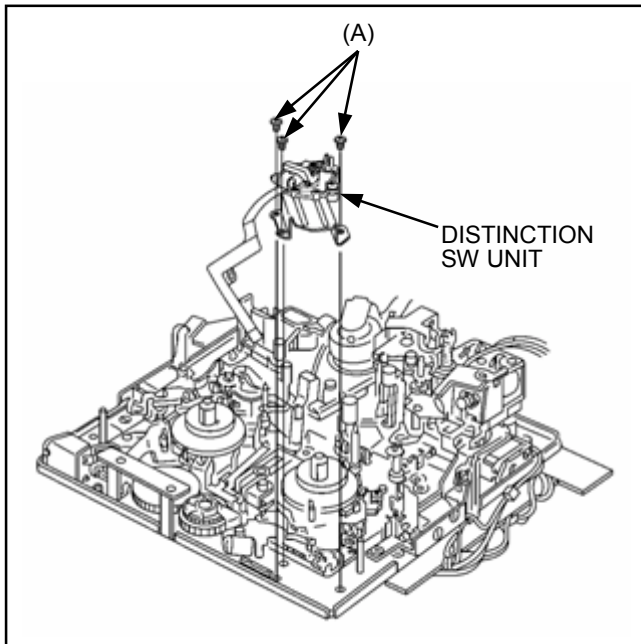


Figure 5-23-1

5-24. Reel Drive Motor Unit Replacement

(Removal)

1. Disconnect the **P16** on the **MECH I/F**.
2. Unscrew the 2 screws (A) and remove the Reel Drive Sensor P.C.Board as shown in Figure 5-24-1.
3. Unscrew the 2 screws (B) and remove the Reel Drive Motor Unit as shown in Figure 5-24-1.

(Installation)

1. Install the new Reel Drive Motor Unit following the removal step in reverse order.

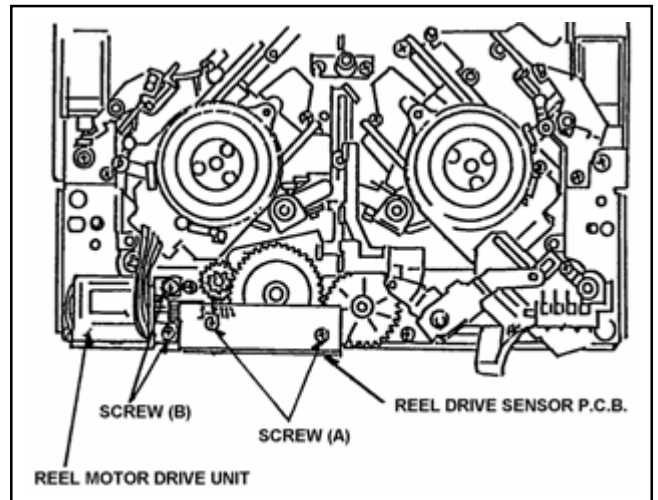


Figure 5-24-1

5-25. L-M Release Angle Unit Replacement

(Removal)

1. Unscrew the 2 screws (A) and remove the L-M Release Angle Unit as shown in Figure 5-25-1.

(Installation)

1. Install the new L-M Release Angle Unit following the removal steps reverse order.

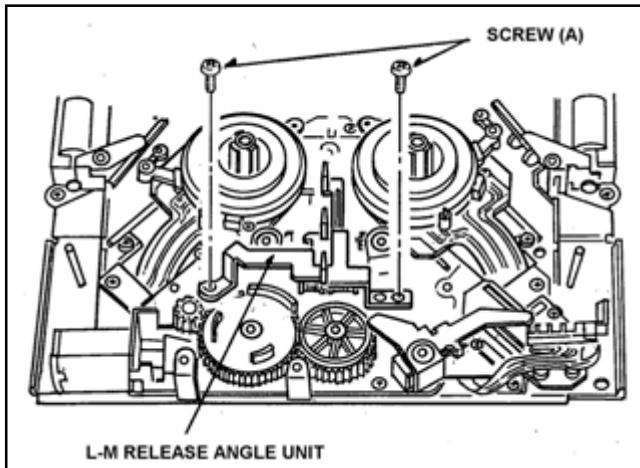


Figure 5-25-1

5-26. Slide Rod Unit Replacement & Adjustment

(Removal)

1. Remove the L-M Release Angle Unit. (Refer to item 5-25)

2. Remove the Reel Drive Sensor P.C.Board. (Refer to item 5-24).
3. Remove the Cut Washer (A) and remove the Reel Drive Cam Gear as shown in Figure 5-26-1.
4. Remove the Cut Washer (B) and remove the MIC Drive Arm Unit as shown in Figure 5-26-1.
5. Remove the Cut Washer (C) and remove the MIC Geneva Gear as shown in Figure 5-26-1.
6. Remove the Cut Washer (D) and remove the Reel Drive Arm Unit as shown in Figure 5-26-2.
7. Remove the Supply and Take Up Reel Rotor Unit. (Refer to item 5-5)
8. Remove the 2 Cut Washers (E) and remove the Supply and Take Up Base Drive Arm Unit.
9. Remove the 2 Cut Washers (F) and remove the Slide Rod Unit.

(Installation)

1. Install the new Slide Rod Unit following the removal steps in reverse order.
2. After installation of the Reel Drive Cam Gear and MIC Geneva Gear, phase adjustment should be performed as follows.

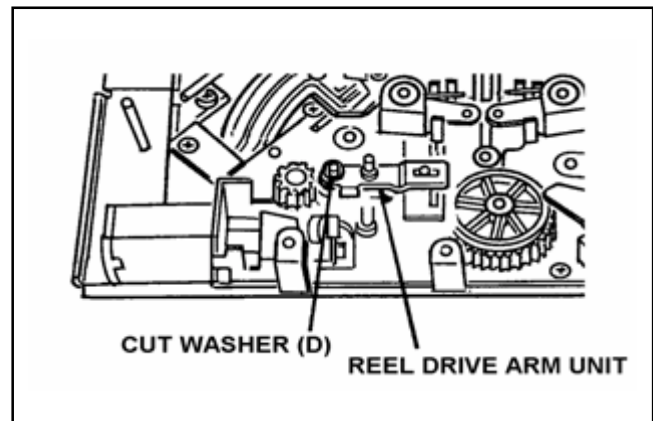


Figure 5-26-2

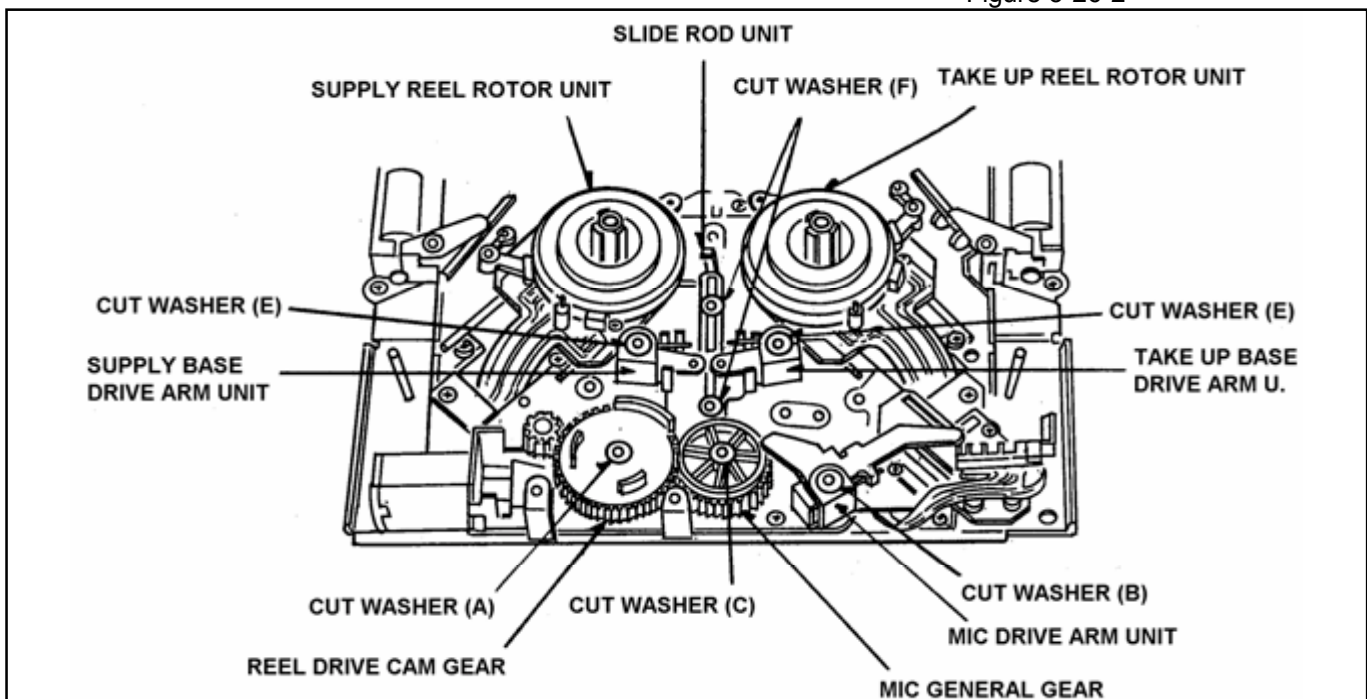


Figure 5-26-1

(Adjustment)

1. Install the MIC Geneva Gear to the Chassis.
2. Place the Reels in the M-Size position by hand.
3. Install the MIC Drive Arm Unit.
4. Place the REC Inhibit SW in front position on Distinction SW Unit by rotation of MIC Geneva Gear, and then MIC Geneva Gear should be positioned as shown in Figure 5-26-3.

Note:

Protrusion of MIC DRIVE Arm Unit is positioned as shown in Figure 5-26-3.

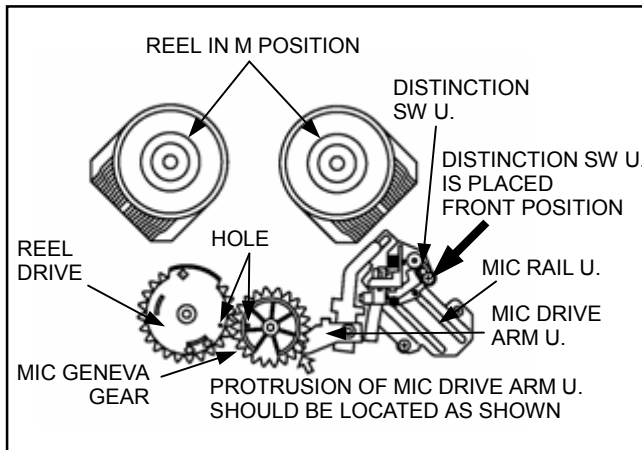


Figure 5-26-3

5. Install the Reel Drive Cam Gear and the hole of Reel Drive Cam Gear should match with the hole of MIC Geneva Gear as shown in Figure 5-26-3.
6. Install the Cut Washer (A), (B) and (C) as shown in Figure 5-26-1.

Point of Adjustment:

- 1) Reel in M-Size position.
- 2) Set the REC Inhibit SW in front position of Distinction SW Unit.
- 3) Protrusion of MIC Drive Arm Unit is positioned as shown in Figure 5-26-3.
- 4) Holes between Reel Drive Cam Gear and MIC Geneva Gear are matched.

5-27. M-Stopper Solenoid Replacement & Adjustment

(Removal)

1. Remove the **P24** on the **MECH I/F**.
2. Unscrew the 4 screws (A) and (B) and remove the M-Stopper Solenoid as shown in Figure 5-27-1.

(Installation)

1. Install the new M-Stopper Solenoid following the removal steps in reverse order.
2. After installation, position adjustment should be performed as follows.

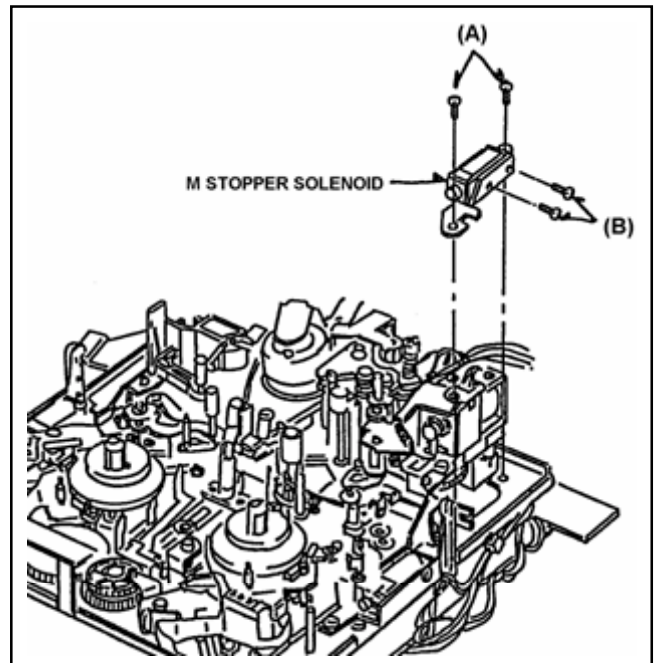


Figure 5-27-1

(Adjustment)

1. Place the reels in the L size position.
2. Push the iron core of M-Stopper Solenoid by hand.
3. Observe the clearance (A) between Mech. Chassis and M-Stopper as shown in Figure 5-27-2. And make sure that it is within 1.1 to 1.3mm.
4. If not, loosen the 2 screws (A), which fixed M-Stopper Solenoid. And adjust the position of M-Stopper Solenoid so that the clearance (A) is within the specification. And tighten the 2 screws (A).

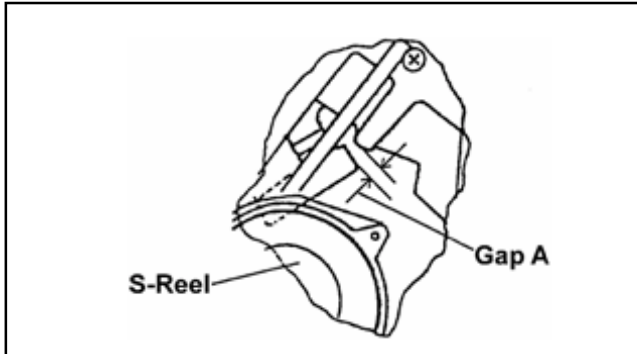


Figure 5-27-2

5-28. T4 Post Position Adjustment

1. Confirm that the hole (B) of T4 connection Gear match with the hole of T4 post as shown in figure 5-28-1.
2. Confirm that the portion (C) of T4 connection Gear and hole (A). Those are located as shown in figure 5-28-1.
3. If not, adjust the phase of T4 post.

Note:

This confirmation should be performed on unloading condition.

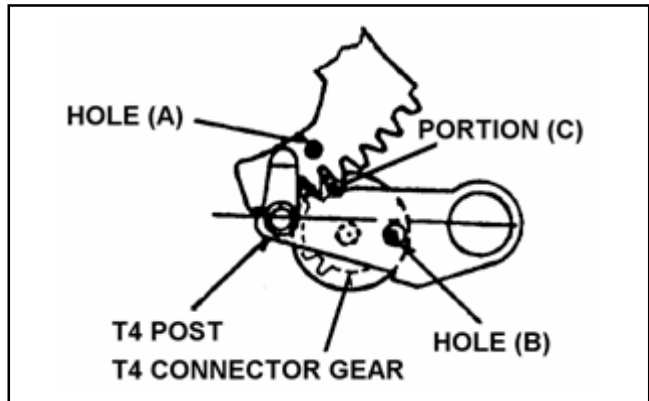


Figure 5-28-1

6. CONNECTOR LOCATION

6-1. Mech. I/F P.C. Board

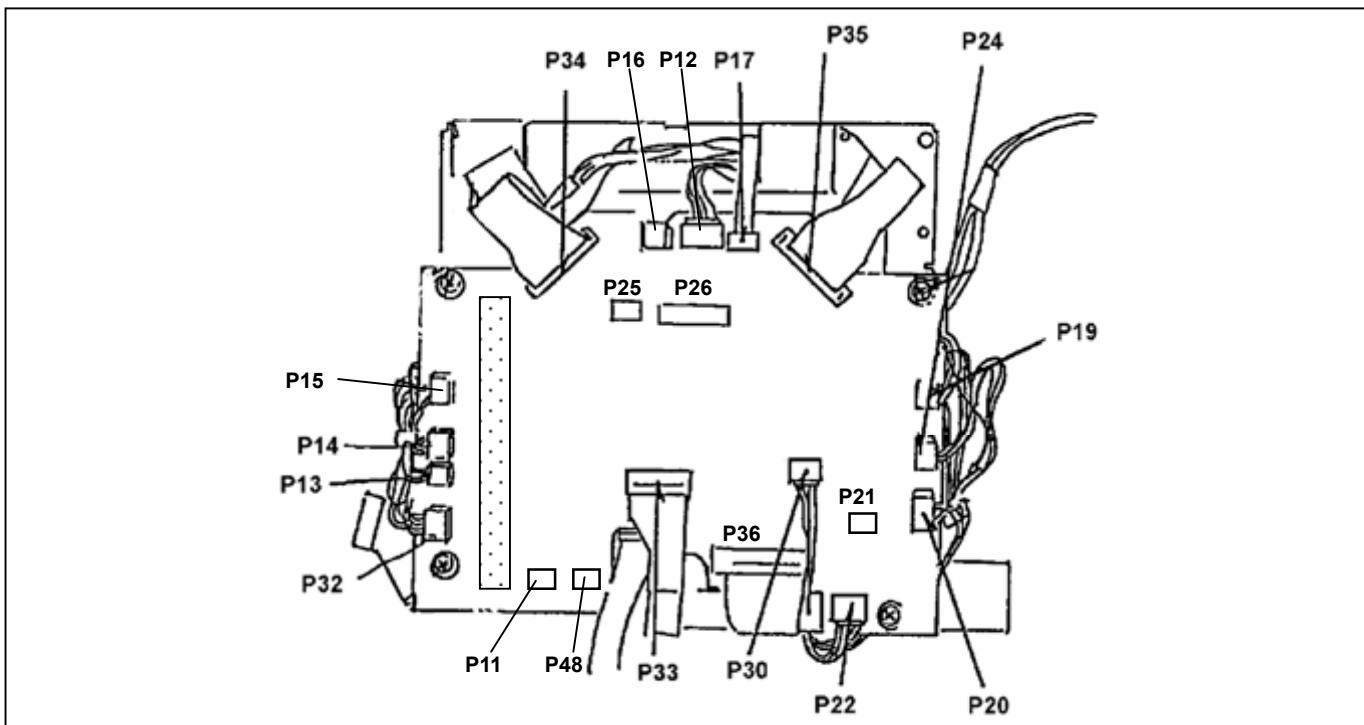


Figure 6-1-1

SECTION 4

ELECTRICAL ADJUSTMENT

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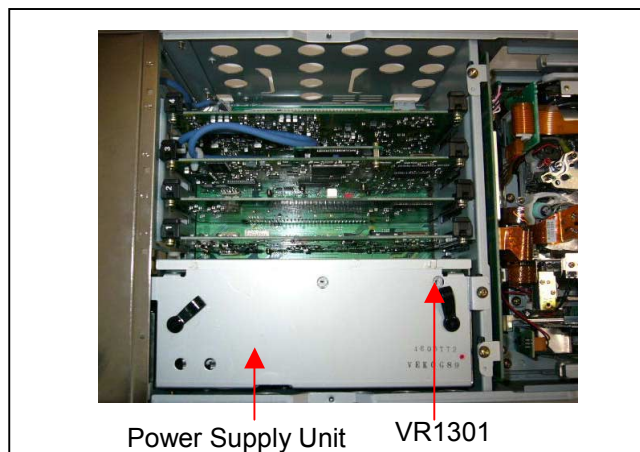
Cautions on Extender use

Although the following phenomenon arise when Extender Board (VFK1498 or VFK1193) is used, they are not the abnormalities of VTR. Please be sure to remove the Extender Board in the case of a performance check.

Board	Phenomenon
Servo	No Problem
AVMON	1. If the AVIO (AJ-YA93) has been installed, the initialize may not be performed correctly. 2. Video disturbance may appear in the IEEE1394 EE mode.
DPROC	Noise on the audio or video disturbance may appear in the EE mode.
AVIO	No problem
SDI	No problem

1. POWER UNIT

<1> Power Unit and VR Location



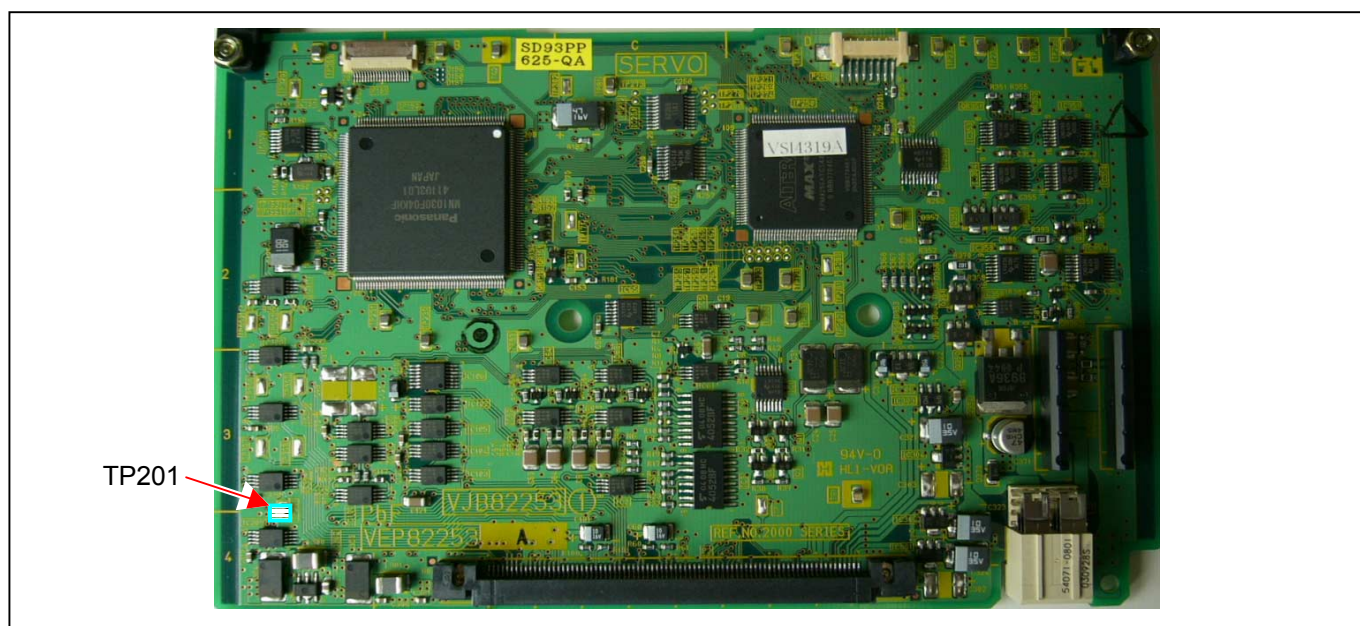
1-1. Power Supply Voltage Adjustment

BOARD	POWER UNIT
TP	TP3 (on the extender board)
ADJ.	VR1301
TAPE	----
INPUT	----
MODE	EJECT
M. EQ	Digital Voltmeter
SPEC.	+3.20V \pm 0.05V

1. Extend the DPROC Board (F3) with the extender board.
2. Turn ON the power switch, and place the VTR in the "EJECT" mode.
3. Adjust VR1301 so that the DC voltage is in the specification.

2. SERVO BOARD (F1)

<1> TP Location>



2-1. Reel Torque Gain Adjustment

BOARD	SERVO (F1)
TP	-----
ADJ.	SERVICE MENU,
TAPE	-----
INPUT	-----
MODE	EJECT
M. EQ	Monitor TV
SPEC.	-----

1. Open the SERVICE MENU. (Refer to SEC1 Service Information.)
2. Select the **A00: SERVO ADJUST** and press the "SET" button to open the SERVO ADJUST MENU.
3. Select the **A02:RL GAIN ADJ** by using the "Joy Stick".
4. Press the "Search" button continuously until the two kind of numeric value displayed on the right side of **RL GAIN ADJ** goes off one time. Release the "Search" button when the both two new numeric value has been updated. (It takes 5-6 seconds.)
5. Perform the Item 4 again. And confirm the numeric value is changed to new value.
6. Close the menu.

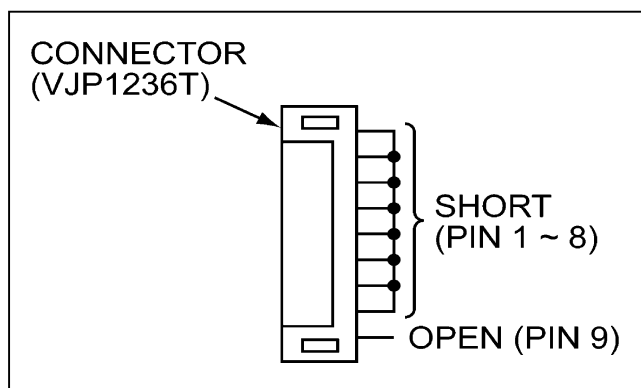
<Note>

1. Before "2-2. Motor Torque Offset Adjustment" is done, implement this adjustment.

2-2. Motor Torque Offset Adjustment

BOARD	SERVO (F1)
TP	S,T REEL TABLE
ADJ.	SERVICE MENU
TAPE	-----
INPUT	-----
MODE	EJECT
M. EQ	VFK1191A (Dial Torque Gauge) VFK1152 (Dial Torque Gauge Adaptor)
SPEC.	0.16 ± 0.01 cNm (15g-cm ± 2g-cm) (5 times average)

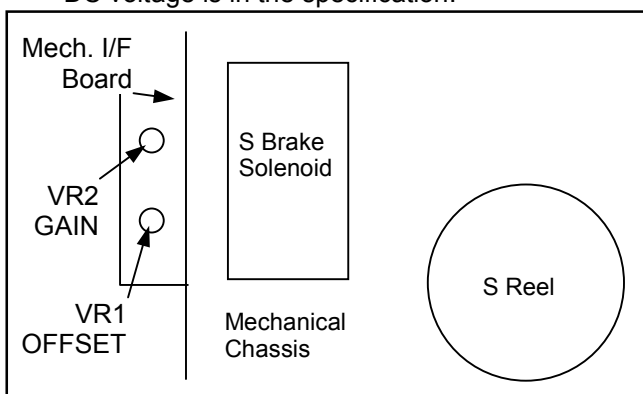
1. Remove the Front Loading Unit. (Refer to SEC2 Disassembly Procedures)
 2. Connect the Carriage tool (see the following figure) to connector P1 which is coming from the MECH. I/F board to Carriage board of the front loading unit.
 3. Open the SERVICE MENU. (Refer to SEC1 Service Information.)
 4. Select the **A00: SERVO ADJUSTS** and press the "SET" button to open the Servo Adjust menu.
 5. Select the **A03: T TORQUE**.
 6. Set a Dial Torque Gauge to top of Take-up Reel Table.
 7. Press the "Search" button and measure the value of Dial Torque Gauge 5 times, then calculate the average and adjust "T TORQUE" with "Menu" so that the average is in the specification.
- Note:** While pressing the "Search" button, the REEL Table is rotated.
8. Select the item **A04: S TORQUE**.
 9. Set a Dial Torque Gauge to top of Supply Reel Table.
 10. Press the "Search" button and measure the value of Dial Torque Gauge 5 times, then calculate the average and adjust "S TORQUE" with "Menu" so that the average is in the specification.
 11. Close the Menu.
 12. Turn the Power switch to OFF.
 13. Disconnect the carriage tool.
 14. Install the Front Loading unit.



2-3. Tension Sensor Voltage Adjustment (1)

BOARD	SERVO (F1)
TP	TP201
ADJ.	VR1 (OFFSET) on the Mech. I/F board
TAPE	-----
INPUT	-----
MODE	EJECT
M. EQ	VFK1191A (Dial Torque Gauge) VFK1152 (Dial Torque Gauge Adaptor)
SPEC.	2.5V \pm 0.05V

1. Connect the Digital voltmeter to TP201.
2. Adjust the VR1 on the Mech. I/F board so that the DC voltage is in the specification.



2-4. Tension Sensor Voltage Adjustment (2)

BOARD	SERVO (F1)
TP	TP201
ADJ.	Sensor Position, VR2 (GAIN)
TAPE	-----
INPUT	-----
MODE	EJECT
M. EQ	Digital voltmeter, VFK1208 (Neutral Position Tool, Black with hole) VFK1156 (PLAY Position Tool, Black)
SPEC.	Neutral position : 2.5V \pm 0.1V PLAY position : 3.8V \pm 0.05V

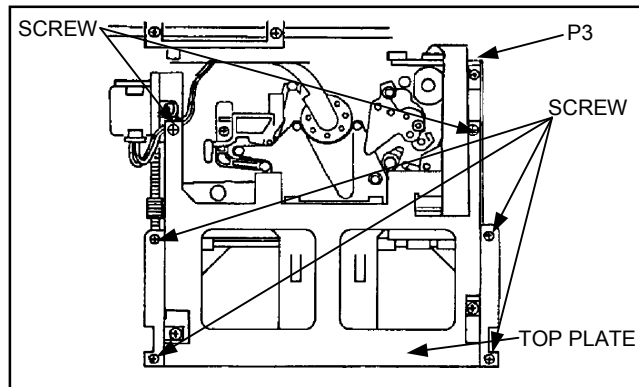
NOTE:

Do not use magnetized tweezers and screwdriver.

Do not touch the magnetize screwdriver to S-Reel FG magnet portion, while adjusting the lever (D) portion.

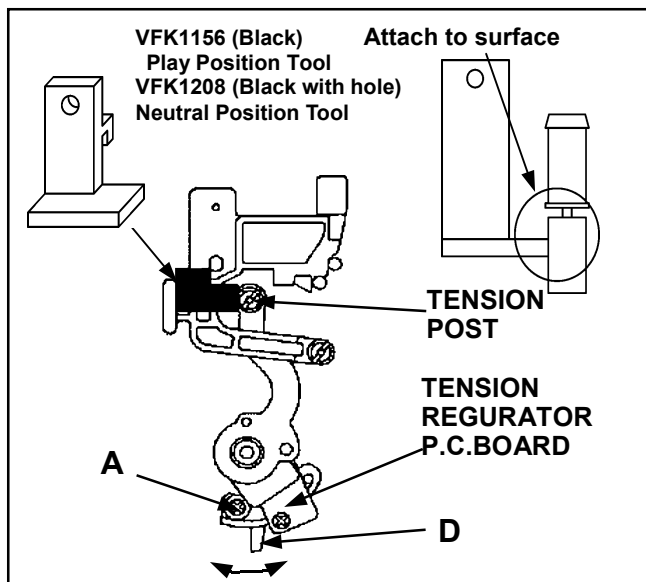
<Preparation>

1. Unscrew the 2 screws and remove the Carriage Support Panel on the Front Loading Unit.
2. Disconnect the connector P3 on the Carriage Board of the Front Loading Unit.
3. Unscrew the 6 screws and remove the Top Plate on the Front Loading Unit as shown in figure below.
4. Connect the Flexible cable to P3 on the Carriage Board of Front Loading Unit.



<Adjustment Procedure>

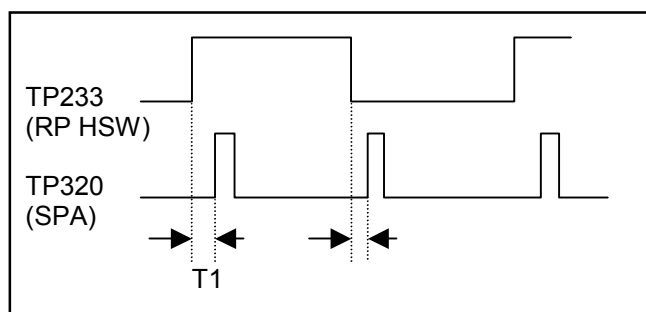
1. Open the SERVICE MENU.
2. Select the **A00: SERVO ADJUST** and press the "SET" button to open the SERVO ADJUST MENU.
3. Select the **A09 TENSION**.
4. Install the VFK1208 (black with hole) as shown in figure.
5. Connect the Digital voltmeter to TP201.
6. Lean the "JOY STICK" rightward so that the mechanism shifts to the Loading mode.
7. Confirm the DC voltage at TP201 is 2.5V \pm 0.1V (Neutral position). If it is not, adjust the sensor position as follows.
Loosen the screw (A) and move the lever (D) with tweezers. After adjusting, rotate JOG dial counter clockwise pushing Search button to set the unloading position.
8. Remove the VFK1208 (black with hole), and install the VFK1156 (Black) as same way as VFK1208.
9. Lean the "JOY STICK" rightward so that the mechanism shifts to the Loading mode.
10. Adjust the VR2 (GAIN) on the Mech. I/F board so that the DC voltage at TP201 is 3.8V \pm 0.05V (PLAY position).
11. Close the Menu.



2-5. PG Shifter Adjustment (50M)

BOARD	SERVO (F1)
TP	----
ADJ.	SERVICE MENU
TAPE	VFM3580KM or KL (NTSC) VFM3680KM or KL (PAL)
INPUT	----
MODE	PLAYBACK
M. EQ	Oscilloscope
SPEC.	T1, T2 = 126.8usec \pm 4usec

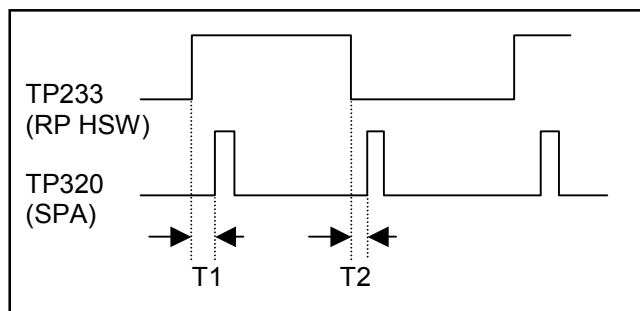
1. Open the SERVICE MENU. (Refer to SEC1 Service Information.)
2. Select the **A00: SERVO ADJUST** and press the "SET" button to open the SERVO ADJUST MENU.
3. Select the **A05 PG SHIFT 50**.
4. Play back the color bar portion of the 25M alignment tape.
5. Press the "Search" button continuously until the numeric value displayed on the right side of PG shift 50 goes off one time. Release the "Search" button when the new numeric value has been updated.
6. Confirm that the timing of the Head Switching signal is as shown below.
7. Close the menu.



2-6. PG Shifter Adjustment (25M)

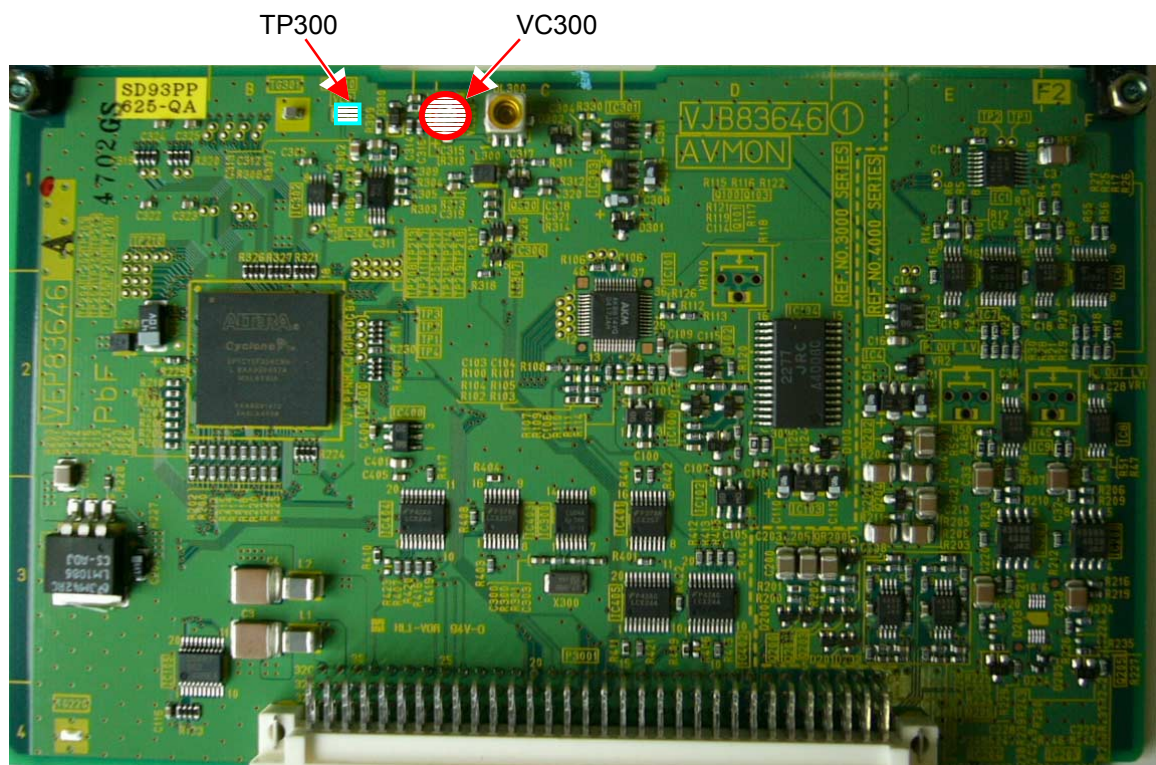
BOARD	SERVO (F1)
TP	----
ADJ.	SERVICE MENU
TAPE	VFM3580KM or KL (NTSC) VFM3680KM or KL (PAL)
INPUT	----
MODE	PLAYBACK
M. EQ	Oscilloscope
SPEC.	T1, T2 = 253.6usec \pm 8usec

1. Open the SERVICE MENU. (Refer to SEC1 Service Information.)
2. Select the **A00: SERVO ADJUST** and press the "SET" button to open the SERVO ADJUST MENU.
3. Select the **A06 PG SHIFT 25**.
4. Play back the color bar portion of the 25M alignment tape.
5. Press the "Search" button continuously until the numeric value displayed on the right side of PG shift 25 goes off one time. Release the "Search" button when the new numeric value has been updated.
6. Confirm that the timing of the Head Switching signal is as shown below.
7. Close the menu.



3. AVMON BOARD (F2)

<1> TP/VC Location



3-1. PLL DC Adjustment

BOARD	AVMON (F2)
TP	TP300
ADJ.	VC300
INPUT	----
MODE	EE
TAPE	----
M. EQ	Oscilloscope
SPEC.	0VDC \pm 0.1VDC

<Service Menu>

F00 VIDEO AJUST, F18 --- DIF PLL TEST : ON

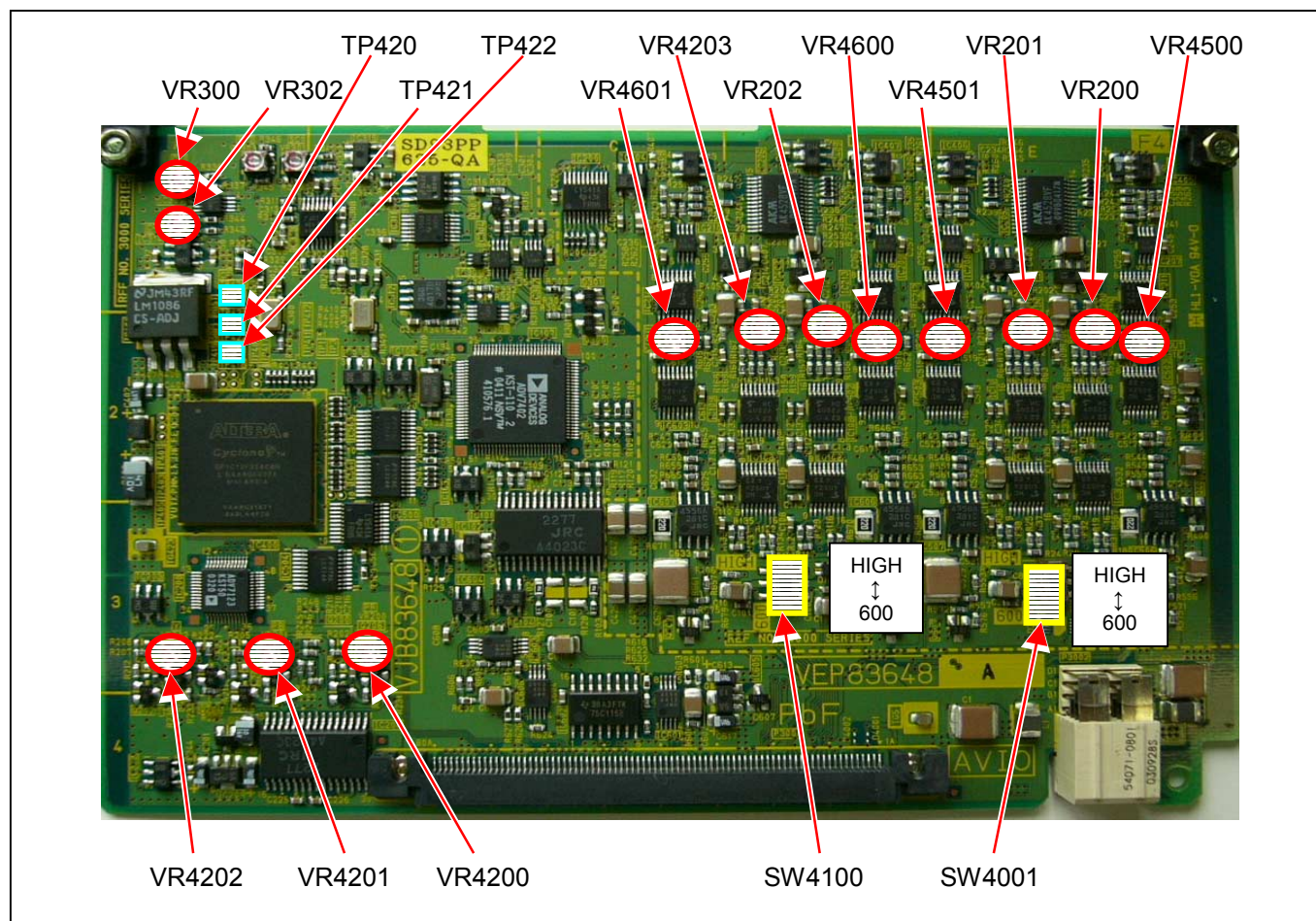
1. Open the Service Menu and select the above.
2. Adjust VC300 so that the DC voltage is in the specification.

4. AVIO BOARD [AJ-YA93] (F4)

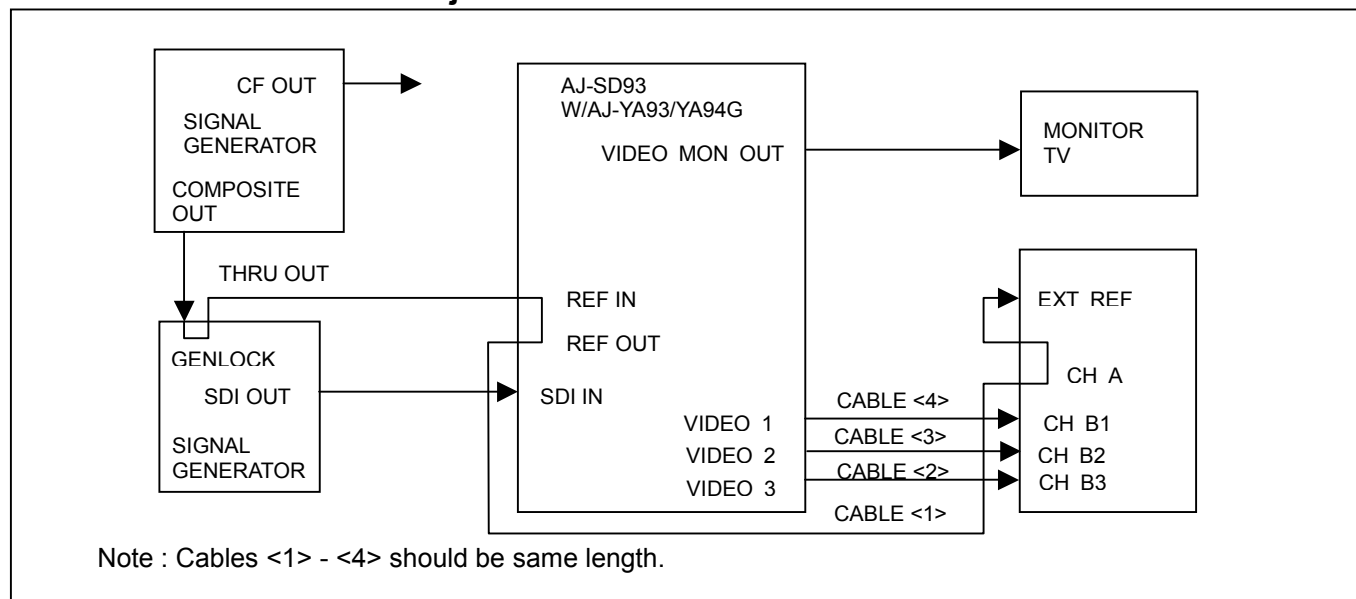
Note:

1. In order to perform the audio and video adjustments, Optional Board AJ-YA93 should be installed in the AJ-SD93.

<1> Location of TPVR/SW



<2> Connection for Video Adjustment



Note : Cables <1> - <4> should be same length.

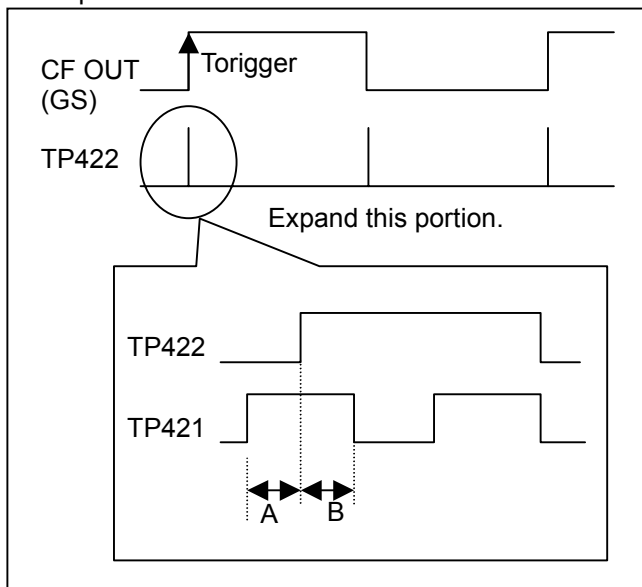
4-1a. Reference CF Detection Adjustment (NTSC)

BOARD	AVIO (F4)
TP	TP421, TP422
ADJ.	VR300
INPUT	SDI INPUT : 100% Color Bar
MODE	EE
TAPE	-----
M. EQ	Oscilloscope
SPEC.	A=B \pm 5%

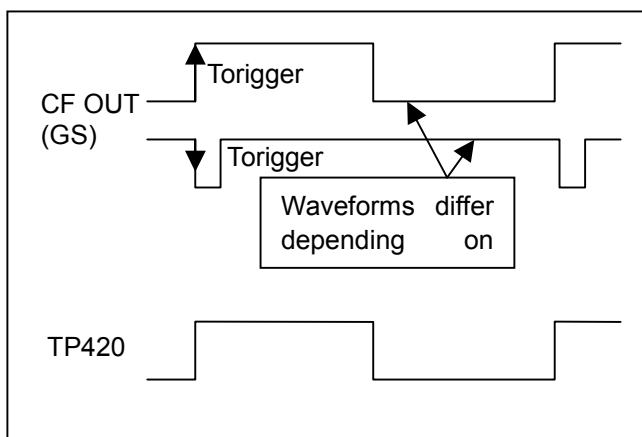
<Setup Menu>

070 ----- TV SYSTEM 525

1. Expand the pulse portion of TP422.
2. Adjust VR300 so that the widths A and B are equal as shown below.



3. Make sure that the phase between the CF pulse from the signal generator and TP420 is as shown below.



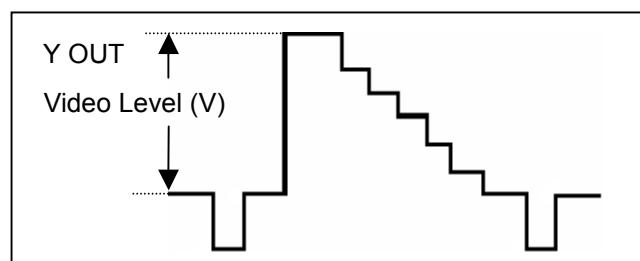
4-2a. Component Y Level Adjustment (NTSC)

BOARD	AVIO (F4)
TP	Y OUT
ADJ.	VR202
INPUT	SDI INPUT : 100% Color Bar
MODE	EE
TAPE	-----
M. EQ	WFM
SPEC.	Video (V) = 714mV \pm 3mV

<Setup Menu>

070 ----- TV SYSTEM 525

1. Press the Video Select button on the front panel to select the Y/PB/PR mode.
2. Adjust VR202 so that the video level (V) is in the specification.



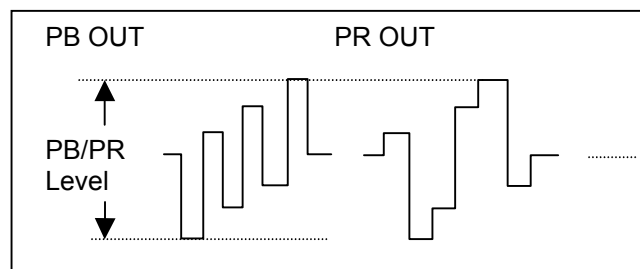
4-3a. Component Y Level Adjustment (NTSC)

BOARD	AVIO (F4)
TP	PB/PR OUT
ADJ.	VR201 (PB), VR200 (PR)
INPUT	SDI INPUT : 100% Color Bar
MODE	EE
TAPE	-----
M. EQ	WFM
SPEC.	PR /PR = 1009mV \pm 3mV

<Setup Menu>

070 ----- TV SYSTEM 525

1. Press the Video Select button on the front panel to select the Y/PB/PR mode.
2. Adjust VR201 and VR200 so that the PB and PR levels are in the specification.



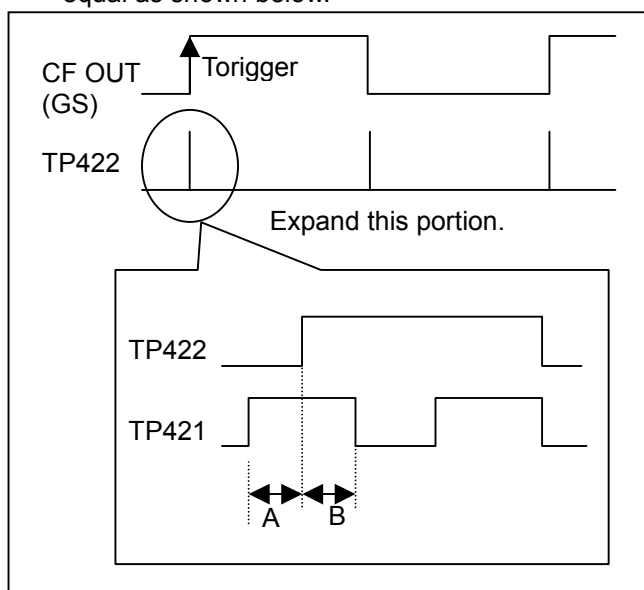
4-1b. Reference CF Detection Adjustment (PAL)

BOARD	AVIO (F4)
TP	TP421, TP422
ADJ.	VR302
INPUT	SDI INPUT : 100% Color Bar
MODE	HD SDI IN : 1080/59i Color Bar
TAPE	EE
M. EQ	Oscilloscope
SPEC.	A=B \pm 5%

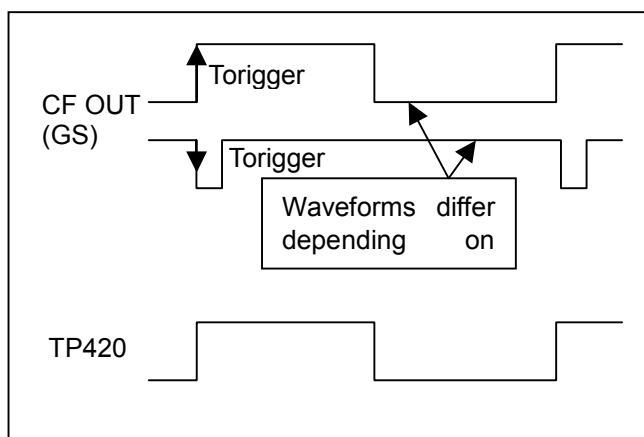
<Setup Menu>

070 ----- TV SYSTEM 625

1. Expand the pulse portion of TP422.
2. Adjust VR302 so that the widths A and B are equal as shown below.



1. Make sure that the phase between the CF pulse from the signal generator and TP420 is as shown below.



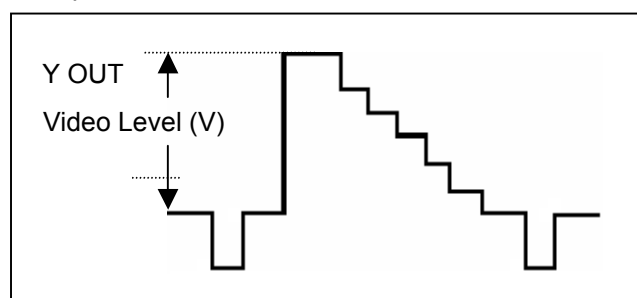
4-2b. Component Y Level Adjustment (PAL)

BOARD	AVIO (F4)
TP	Y OUT
ADJ.	VR202
INPUT	SDI INPUT : 100% Color Bar
MODE	EE
TAPE	----
M. EQ	WFM
SPEC.	Video (V) = 714mV \pm 3mV

<Setup Menu>

070 ----- TV SYSTEM 625

1. Adjust VR300 so that the video level (V) is in the specification.



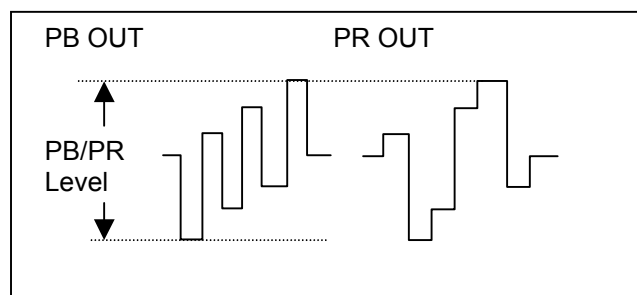
4-3b. Component Y Level Adjustment (PAL)

BOARD	AVIO (F4)
TP	PB/PR OUT
ADJ.	VR201 (PB), VR200 (PR)
INPUT	SDI INPUT : 100% Color Bar
MODE	EE
TAPE	----
M. EQ	WFM
SPEC.	PR /PR = 1009mV \pm 3mV

<Setup Menu>

070 ----- TV SYSTEM 625

1. Adjust VR201 and VR200 so that the PB and PR levels are in the specification.



4-4. Audio Initial Setting

<Switches on the Front Panel>

Set the Switch and Control on the Front Panel as shown below.

Switch & Control	Setting
REC/PB VR (CH1,2,3,4)	Center Click Point
REC/UNITY/PB	UNITY
AUDIO IN	ANALOG
REMOTE/LOCAL	LOCAL
MONITOR	L (CH1), R (CH2)

<Switches on the AVIO Board>

SW100 : High
SW101 : High

<Audio Analyzer Setting>

Set the Audio Analyzer as shown below.

Item	Setting
GENERATOR OUTPUT	50Ω (A&B, BAL, FLOAT)
ANALYZER CHA INPUT	100Ω
ANALYZER CHB INPUT	100Ω
UNIT SETTING	dBu

<Service Menu Setting>

- Open the USER Menu.
- Press the "EJECT" + "STOP" + "MENU" buttons together so that the SERVICE MENU appears.

No.	Item	Setting
G01	REF. LEVEL1	P : FS20 E/MC : FS18
G02	REF. LEVEL2	0dB
G03	REF.LV INI	P/E : 0dB MC : 4dB
G05	MIC IN LV	DIS

< Setup Menu Setting for Audio >

No.	Item	Setting	
		P/E	MC
700	AUDIO IN SE L	ANA	
701	CH1 IN LV	0dB	+4dB
702	CH2 IN LV	0dB	+4dB
703	CH3 IN LV	0dB	+4dB
704	CH4 IN LV	0dB	+4dB
706	CH1 OUT LV	0dB	+4dB
707	CH2 OUT LV	0dB	+4dB
708	CH3 OUT LV	0dB	+4dB
709	CH4 OUT LV	0dB	+4dB
722	REC CH1	CH1	
723	REC CH2	CH2	
724	REC CH3	CH3	
725	REC CH4	CH4	

4-5. Audio Output Level Adjustment

BOARD	AVIO (F4)
TP	AUDIO OUT (CH1-CH4)
ADJ.	VR4500 [CH1 OUT LV] VR4501 [CH2 OUT LV] VR4600 [CH3 OUT LV] VR4601 [CH4 OUT LV]
INPUT	INT SG 0)
MODE	EE
TAPE	---
M. EQ	Monitor TV, Oscilloscope, Audio Analyzer
SPEC.	AJ-SD93P/E : 0 dBu ± 0.1dB AJ-SD93MC : +4 dBu ± 0.1 dB

- Set the Switches on the Front Panel as shown below.
AUDIO INPUT SELECT SW : SG
REC/UNITY/PB SW : UNITY
- Adjust VR4500, VR4501, VR4600 and VR4601 so that the Audio Output Level at CH1-CH4 is in the specification.
- Make sure that the Audio Output waveforms are normal sine wave.

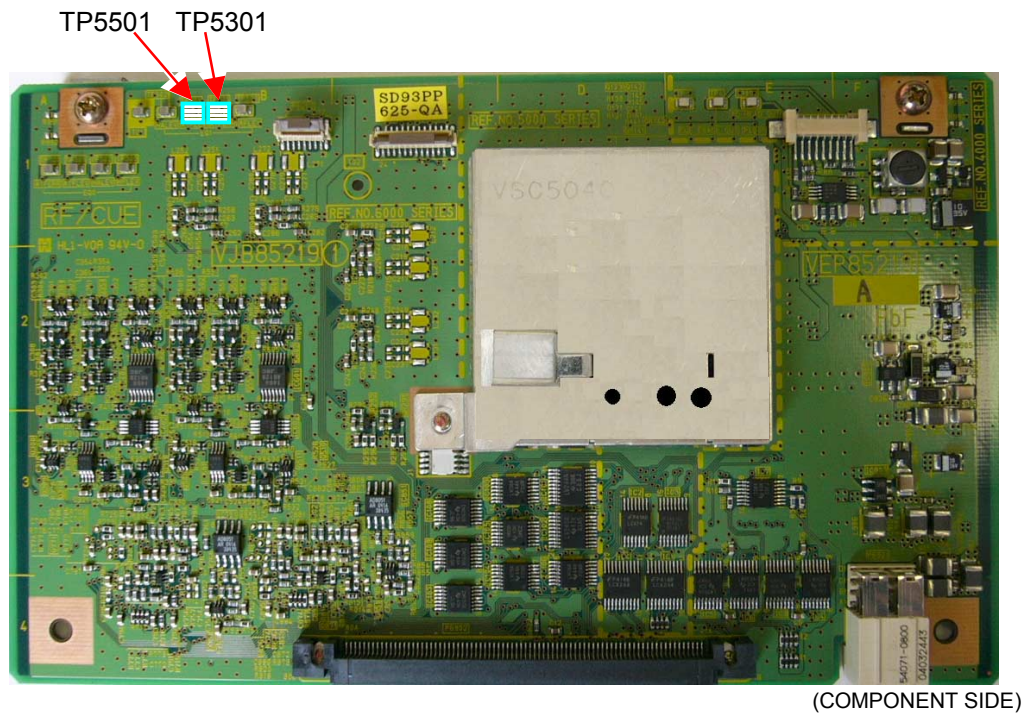
4-6. Audio Input Level Adjustment

BOARD	AVIO (F4)
TP	AUDIO OUT (CH1-CH4)
ADJ.	VR4200 [CH1 IN LV] VR4201 [CH2 IN LV] VR4202 [CH3 IN LV] VR4203 [CH4 IN LV]
INPUT	AUDIO IN (CH1-CH4) Sine Wave, 1 KHz, AJ-SD93P/E : 0dBu, AJ-SD93MC: +4dBu
MODE	EE
TAPE	---
M. EQ	Monitor TV, Oscilloscope, Audio Analyzer
SPEC.	AJ-SD93P/E : 0 dBu ± 0.1dB AJ-SD93MC : +4 dBu ± 0.2 dB

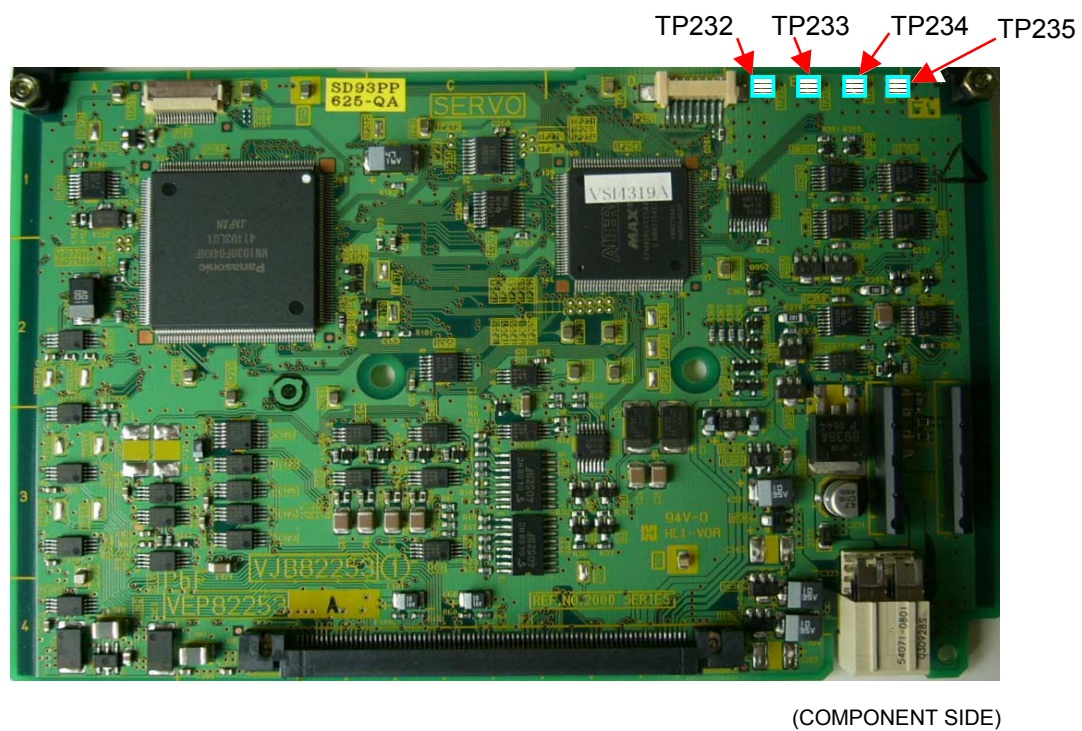
- Supply the following signal to the AUDIO INPUTS (CH1-CH4).
1 KHz, 0dBu : AJ-SD93P/E
1 KHz, +4dBu : AJ-SD93MC
- Adjust VR4200, VR4201, VR4202 and VR4203 so that the audio level at the Audio Outputs (CH1-CH4) is in the specification.

5. RF/CUE BOARD

<1> TP/VR Location



<2> TP/VR Location (Servo Board)



< Note >

After replacing the cylinder unit, perform the paragraphs 4-1, 4-2, and 4-3. "RF Level Adjustments" before performing LISTA adjustment.

5-1. RF Level Adjustment (50M)

BOARD	RF/CUE
TP	See Table Below
ADJ.	Service Menu
INPUT	----
MODE	STILL
TAPE	VFM3580KM or KL (Color Bar) [NTSC] VFM3680KM or KL (Color Bar) [PAL]
M. EQ	Oscilloscope
SPEC.	A Max = 600mVp-p ± 100mV

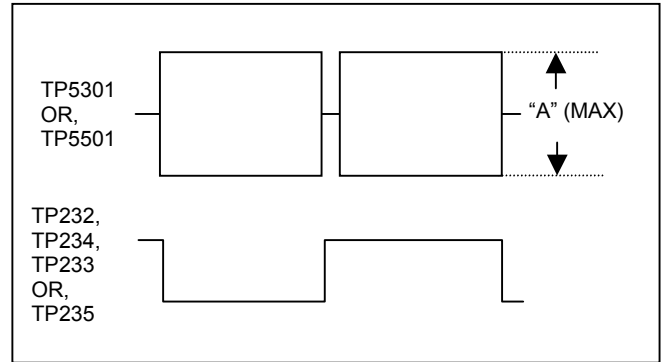
<Service Menu Setting>

B00:RF ADJUST → P00:DVCPRO 50M ADJUST

1. Open the service menu and select the above and then select "P-2: PB ADJUST" on the RF Adjust sub screen 2.
2. Select "P03: ATF MAG L1" on the item select screen.
3. Connect the oscilloscope to Measuring Point (MP) and Trigger Point (TG) as shown in the table below.
4. Play back the 25M alignment tape in the STILL mode.
5. Adjust the EVR so that the envelope maximum level is in the specification.
6. To save the EVR data, select "P-4 DEFAULT" and press the "JOY STICK", then select "SAVE", press the "JOY STICK" again.
7. Perform the same steps for the PB L2, PB R1/R2, RP L1/L2 and RP R1/R2 heads.

P00:DVCPRO 50M ADJUST (RF ADJUST SUB SCREEN 1)

SERVICE MENU		TEST POINT (RF/QUE)	TRIGGER POINT (SERVO)
RF ADJ. SUB SCREEN 2	ITEM SELECT SCREEN		
P-2: PB ADJUST	P03:ATF MAG L1 P04:ATF MAG L2	TP5301 EQ0 ATFLEV	TP232 (HSW PB L)
	P07:ATF MAG R1 P08:ATF MAG R2	TP5501 EQ1 ATFLEV	TP234 (HSW PB R)
P-3: RP ADJUST	P03:ATF MAG L1 P04:ATF MAG L2	TP5301 EQ0 ATFLEV	TP233 (HSW RP L)
	P07:ATF MAG R1 P08:ATF MAG R2	TP5501 EQ1 ATFLEV	TP235 (HSW RP R)



5-2. RF Level Adjustment (25M)

BOARD	RF/ CUE
TP	See Table Below
ADJ.	Service Menu
INPUT	----
MODE	STILL
TAPE	VFM3580KM or KL (Color Bar) [NTSC] VFM3680KM or KL (Color Bar) [PAL]
M. EQ	Oscilloscope
SPEC.	A Max = 600mVp-p ± 100mV

<Service Menu Setting>

B00:RF ADJUST → Q00:DVCPRO 25M ADJUST

1. Open the service menu and select the above and then select "Q-2: PB ADJUST" on the RF Adjust sub screen 2.
2. Select "Q03: ATF MAG L1" on the item select screen.
3. Connect the oscilloscope to Measuring Point (MP) and Trigger Point (TG) as shown in the table below.
4. Play back the 25M alignment tape in the STILL mode.
5. Adjust the EVR so that the envelope maximum level is in the specification.
6. To save the EVR data, select "P-4 DEFAULT" and press the "JOY STICK", then select "SAVE", press the "JOY STICK" again.
7. Perform the same steps for the PB L2, PB R1/R2, RP L1/L2 and RP R1/R2 heads.

**Q00:DVCPRO 25M ADJUST
(RF ADJUST SUB SCREEN 1)**

SERVICE MENU		TEST POINT (RF/QUE)	TRIGGER POINT (SERVO)
RF ADJ. SUB SCREEN 2	ITEM SELECT SCREEN		
Q-2: PB ADJUST	Q03:ATF MAG L1 Q04:ATF MAG L2	TP5301 EQ0 ATFLEV	TP232 (HSW PB L)
	Q07:ATF MAG R1 Q08:ATF MAG R2	TP5501 EQ1 ATFLEV	TP234 (HSW PB R)
Q-3: RP ADJUST	Q03:ATF MAG L1 Q04:ATF MAG L2	TP5301 EQ0 ATFLEV	TP233 (HSW RP L)
	Q07:ATF MAG R1 Q08:ATF MAG R2	TP5501 EQ1 ATFLEV	TP235 (HSW RP R)

**R00:DV ADJUST
(RF ADJUST SUB SCREEN 1)**

SERVICE MENU		TEST POINT (RF/QUE)	TRIGGER POINT (SERVO)
RF ADJ. SUB SCREEN 2	ITEM SELECT SCREEN		
R-3: RP ADJUST	R03:ATF MAG L1 R04:ATF MAG L2	TP5301 EQ0 ATFLEV	TP233 (HSW RP L)
	R07:ATF MAG R1 R08:ATF MAG R2	TP5501 EQ1 ATFLEV	TP235 (HSW RP R)

5-3. RF Level Adjustment (DV)

BOARD	RF/ CUE
TP	See Table Below
ADJ.	Service Menu
INPUT	----
MODE	STILL
TAPE	VFM3010EDS or EDL (Color Bar) [NTSC] VFM3110EDS or EDL (Color Bar) [PAL]
M. EQ	Oscilloscope
SPEC.	A Max = 600mVp-p ± 100mV

<Service Menu Setting>

B00:RF ADJUST → R00:DV ADJUST

1. Open the service menu and select the above and then select "R-3: RP ADJUST" on the RF Adjust sub screen 2.
 2. Select "R03: ATF MAG L1" on the item select screen.
 3. Connect the oscilloscope to Measuring Point and Trigger Point as shown in the table below.
 4. Play back the DV alignment tape in the STILL mode.
 5. Open the service menu and select "R71 : TRACKING MOD-AUTO L" on the item select screen, and then wait for the RF envelope becomes maximum level.
- Note: In case of the R1/R2 head adjustment, select "R71:TRACKING MOD-AUTO R" on the item select screen.
6. Select "R72 TRACKING VAL" on the item select screen and then adjust the value for the maximum RF
 7. Adjust the EVR so that the envelope level becomes maximum.
 8. To save the EVR data, select "P-4 DEFAULT" and press the "JOY STICK", then select "SAVE", press the "JOY STICK" again.
 9. Perform the same steps for the RP L2, and RP R1/R2 heads.

5-4. RF Automatic Adjustment

<Automatic Adjustment Procedure> (Software)

This software is for Automatic RF Adjustment of DVCPRO50M recorder, AJ-SD93.

< Function >

- 1) RF Adjustment (DVCPRO50M/ DVCPRO25M: Rec. and Play, DV: Play)
- 2) Checking of Error Rate
- 3) Download and Upload of EVR Data
- 4) Saving/ Loading the data of Error Rate and EVR
- 5) Printing the data of Error Rate and EVR

(Before Installation)

* PC Condition

OS : Windows95/ 98/ 98SE/ ME/ 2000 or Over

Display : Over 256 color (if lower than 256 color, the color may have the distortion)

* How to get this software

Download “**Automatic RF Adjustment Software (VFK1806)**” from Jig software page on BSD Web site.

* Installation Method

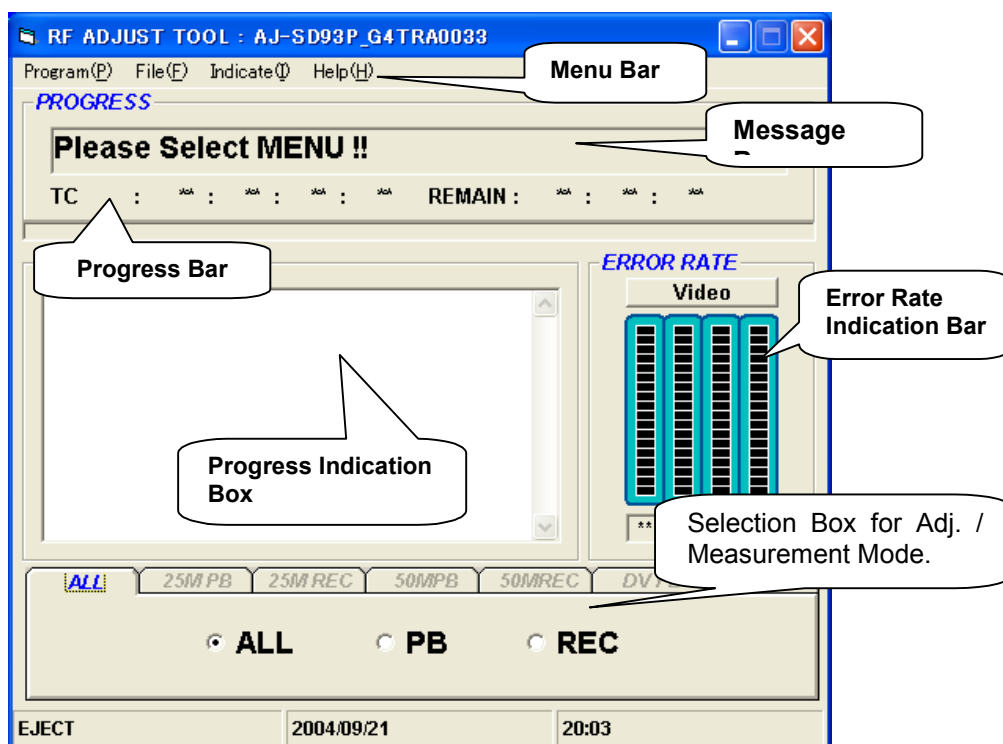
- 1) Extract the downloaded software.
- 2) Click “**setup.exe**”.
- 3) Follow the indication.

* Un-installation Method

Open “**Control Panel**” on Windows and use “**Add/Remove Programs**” to un-install this software.

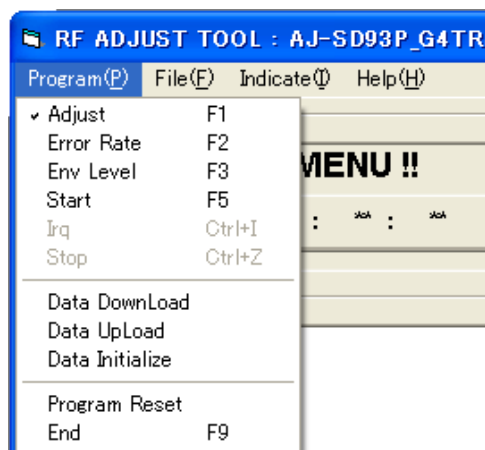
(Explanation of Each Windows)

a) Main Window



a-1) Explanation of Main window and menu bar.

1) Program Menu



[Adjust]

Adjustment program can be selected clicking this portion.

[Error Rate]

Error rate check can be selected clicking this portion.

[START]

Adjustment or Error rate checking can be started by clicking this portion.

[IRQ]

Break into the program during execution by clicking this portion. (It is effective, only on limited process.)

[STOP]

The program can be stopped, forcibly by clicking this portion.

[Data Download]

Receiving EVR data to PC from VTR connected (VTR to PC)

[Data Upload]

Transfer the RF adjustment data from PC to VTR for setting up. (PC to VTR)

* Data Upload can not be functioned unless "**Data Download**", "**Load on File menu**" or **all adjustment program** is executed.

[Data Initialize (include Upload)]

Setting up the RF initial adjustment data into VTR connected.

[Program Reset]

All part of application program can be reset.

[END]

By clicking this portion, application software can be closed.

2) File menu

By clicking this, error rate data and EVR data can be processed as a file.



[Save]

Error rate and/or EVR data can be saved on the file.

During this mode, following file can be made. ***.dst

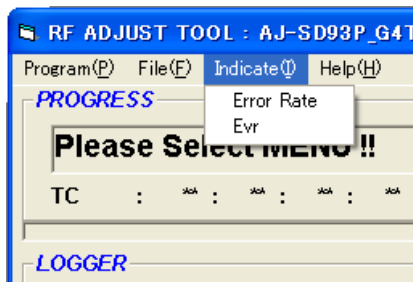
* This item can not be functioned unless "Data Download", "Load on File menu" or all adjustment program is executed.

[Load]

Error rate and/ or EVR data can be loaded from the file (***.dst).

3) Indicate Menu

This is the menu which indicate ErrorRate/ EVR (Adjustment value)



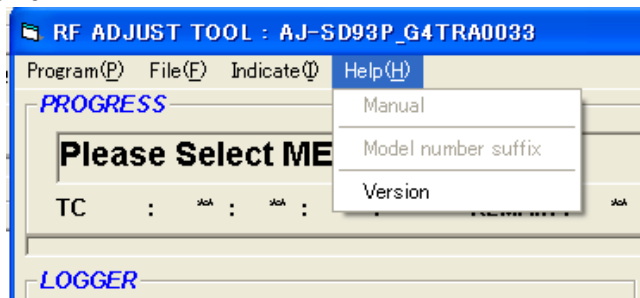
[Error Rate]

Error rate data can be displayed.

[EVR]

EVR data can be displayed.

4) Help Menu



[Manual]

The Operating Instruction Manual for this software will be in this menu.
(Current software version doesn't have this function)

[Version]

Software version is displayed.

a-2) Adjustment/ Measurement item selection BOX
1) Selection of Adjustment/ Measurement category

ALL	25M PB	25M REC	50M PB	50M REC	DV PB
<input checked="" type="radio"/> ALL <input type="radio"/> PB <input type="radio"/> REC					

[ALL]
 All items are selected.

[PB]
 Playback category is selected. 25M PB, 50M PB or DV PB can be individually selected.

[REC]
 Recording category is selected. 25M REC or 50M REC can be individually selected.

2) Selection of Playback category

Select each item according to the one which the adjustment (measurement) is required.
 Check mark on the BOX shows that its item is selected (valid)

ALL	25M PB	25M REC	50M PB	50M REC	DV PB
<input type="checkbox"/> 4500 RP <input type="checkbox"/> 4500 PB					

ALL	25M PB	25M REC	50M PB	50M REC	DV PB
<input type="checkbox"/> 9000 RP <input type="checkbox"/> 9000 PB					

ALL	25M PB	25M REC	50M PB	50M REC	DV PB
<input type="checkbox"/> 9000 RP					

3) Selection of Recording Category

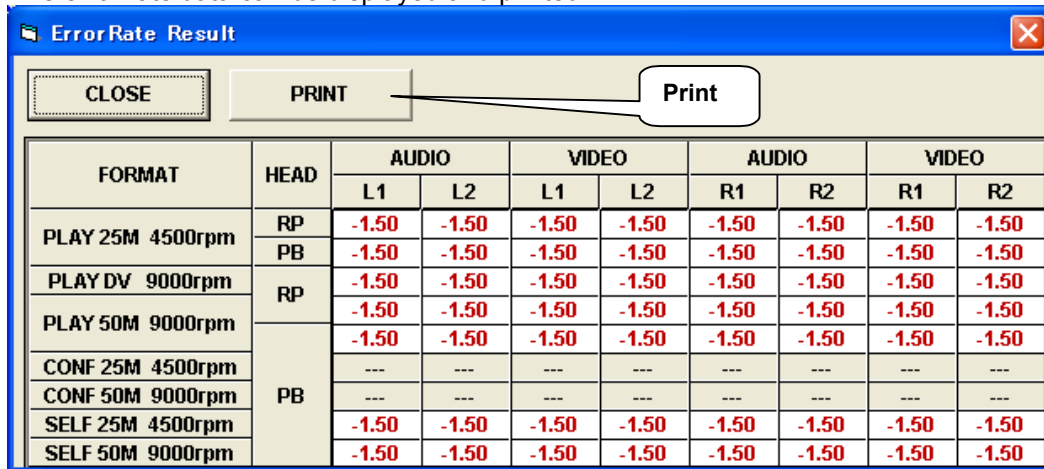
Select each item according to the one which the adjustment (measurement) is required.
 Check mark on the BOX shows that its item is selected (valid)

ALL	25M PB	25M REC	50M PB	50M REC	DV PB
<input type="checkbox"/> 4500 RP					

ALL	25M PB	25M REC	50M PB	50M REC	DV PB
<input type="checkbox"/> 9000 RP					

b) The result of error rate

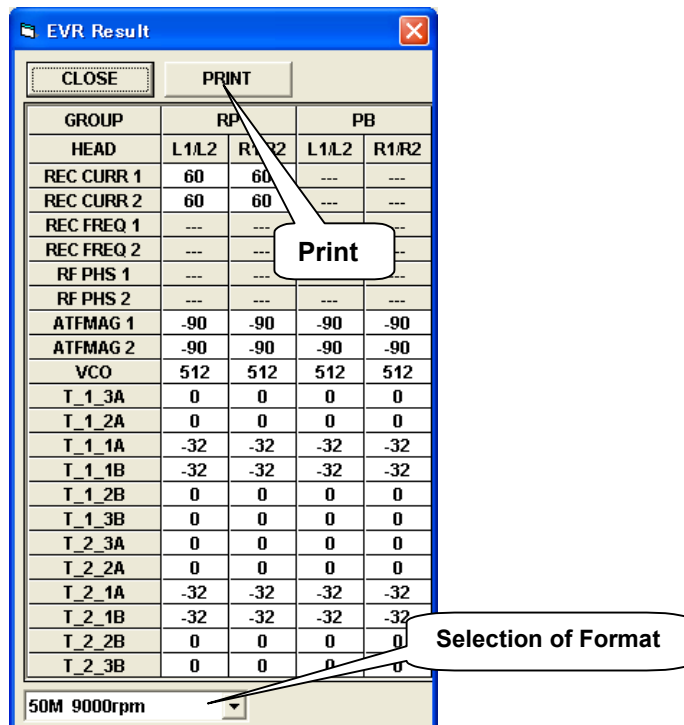
The error rate data can be displayed and printed.



FORMAT	HEAD	AUDIO		VIDEO		AUDIO		VIDEO	
		L1	L2	L1	L2	R1	R2	R1	R2
PLAY 25M 4500rpm	RP	-1.50	-1.50	-1.50	-1.50	-1.50	-1.50	-1.50	-1.50
	PB	-1.50	-1.50	-1.50	-1.50	-1.50	-1.50	-1.50	-1.50
PLAY DV 9000rpm	RP	-1.50	-1.50	-1.50	-1.50	-1.50	-1.50	-1.50	-1.50
PLAY 50M 9000rpm	RP	-1.50	-1.50	-1.50	-1.50	-1.50	-1.50	-1.50	-1.50
CONF 25M 4500rpm	PB	---	---	---	---	---	---	---	---
CONF 50M 9000rpm		---	---	---	---	---	---	---	---
SELF 25M 4500rpm		-1.50	-1.50	-1.50	-1.50	-1.50	-1.50	-1.50	-1.50
SELF 50M 9000rpm		-1.50	-1.50	-1.50	-1.50	-1.50	-1.50	-1.50	-1.50

c) EVR value Chart

The EVR value (adjustment data) can be displayed and printed.



GROUP	RP		PB	
	L1/L2	R1/R2	L1/L2	R1/R2
HEAD				
REC CURR 1	60	60	---	---
REC CURR 2	60	60	---	---
REC FREQ 1	---	---	---	---
REC FREQ 2	---	---	---	---
RF PHS 1	---	---	---	---
RF PHS 2	---	---	---	---
ATFMAG 1	-90	-90	-90	-90
ATFMAG 2	-90	-90	-90	-90
VCO	512	512	512	512
T_1_3A	0	0	0	0
T_1_2A	0	0	0	0
T_1_1A	-32	-32	-32	-32
T_1_1B	-32	-32	-32	-32
T_1_2B	0	0	0	0
T_1_3B	0	0	0	0
T_2_3A	0	0	0	0
T_2_2A	0	0	0	0
T_2_1A	-32	-32	-32	-32
T_2_1B	-32	-32	-32	-32
T_2_2B	0	0	0	0
T_2_3B	0	0	0	0

50M 9000rpm

(Auto EQ Adjustment Procedure)

A) Preparation

- 1) Connect the VTR with PC by RS232C cable (Cross cable) and flash memory version-up tool (VFK1304A) as shown below.

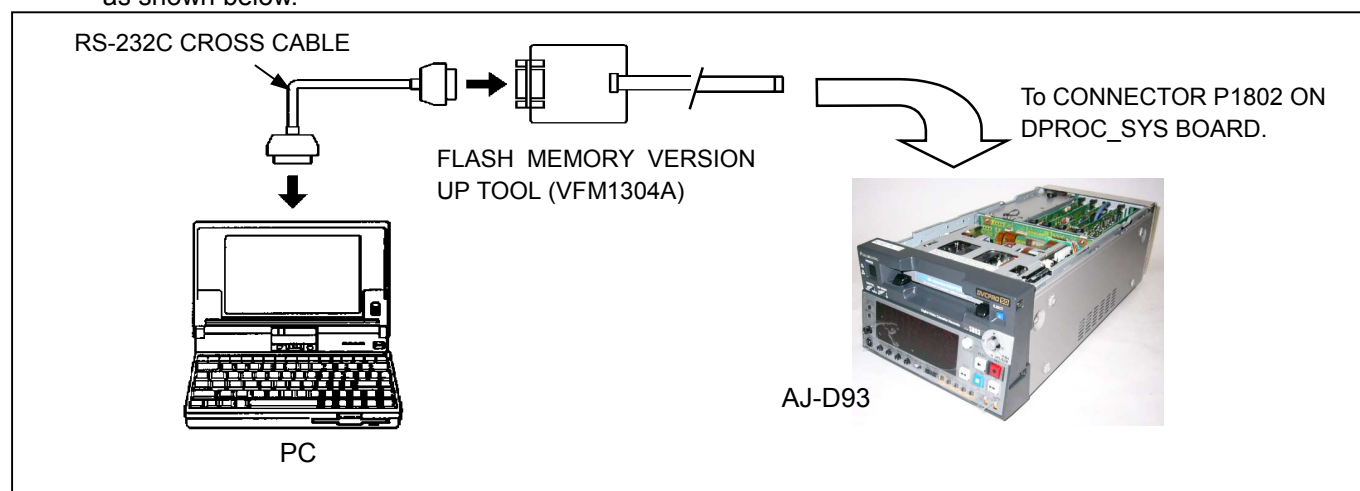


Figure A

- 2) Turn the VTR power on.
- 3) Set the controls on the front panel as shown below.
CONTROL = REMOTE
REC INHIBIT = OFF
TCG = PRESET
SUPPER = ON

B) Execution of Software Application.

- 1) Confirm that the VTR power is on.
- 2) Select start → Program → Panasonic Tool → SD93Rf in the Start menu program in PC.
- 3) Main screen of the application software appears.
- 4) Open the program menu and select as follows;
Adjustment: Select **“Program → Adjust”**.
Measurement: Select **“Program → Error Rate”**.
5) Select the item needed about adjustment & measurement from. Adjustment/ Measurement item selection BOX (refer to (a-2)).
- 6) Select **“Program → Start”**
- 7) Serial no is displayed. Press **“OK”** button. (The information on this window can be changed and added.)



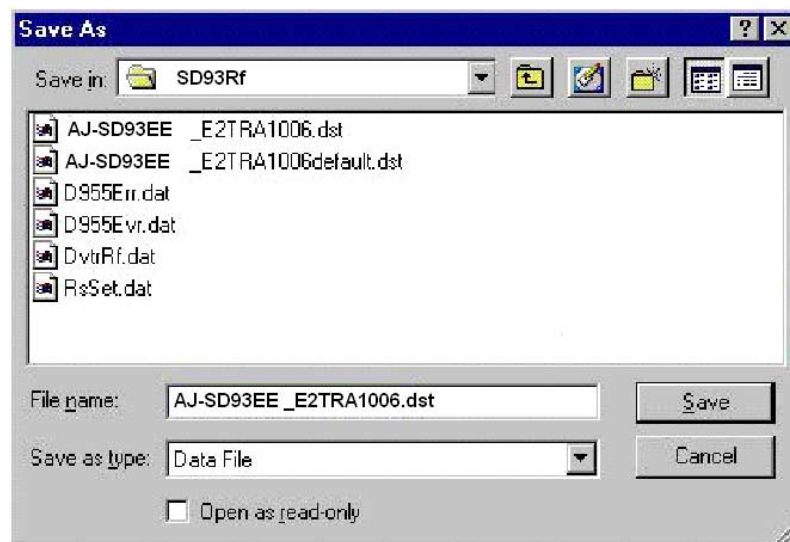
- 8) Follow the indication on the message box. Then adjustment is started automatically.
- 9) Error result is displayed after exciting the adjustment program. Press close button after confirming it.
- 10) Select **“File → Save”** in order to save the Error rate data & EVR data to PC. If it is not needed to save them, skip this process.

(Caution)

This item can not be functioned unless **“Data Download”**, **“Load on File menu”** or **all adjustment program** is excited.

- 11) The screen of item (7) appears again. Press **“OK”** button if serial data information is not needed to change.

12) Following screen appears. Press “**SAVE**” button.



(Reference)

- 1) Storing the adjustment data by manual is not necessary because the adjustment data is automatically stored in the memory after finishing the Automatic Equalizer adjustment.
- 2) Select “**Program STOP**” if the program needs to be stopped.
- 3) Remaining time of the tape is monitored by this program. VTR automatically rewind the tape when the Tape remaining time isn't enough for adjustment or measurement. (Select “**Program → IRQ**” if need to stop REW mode.)

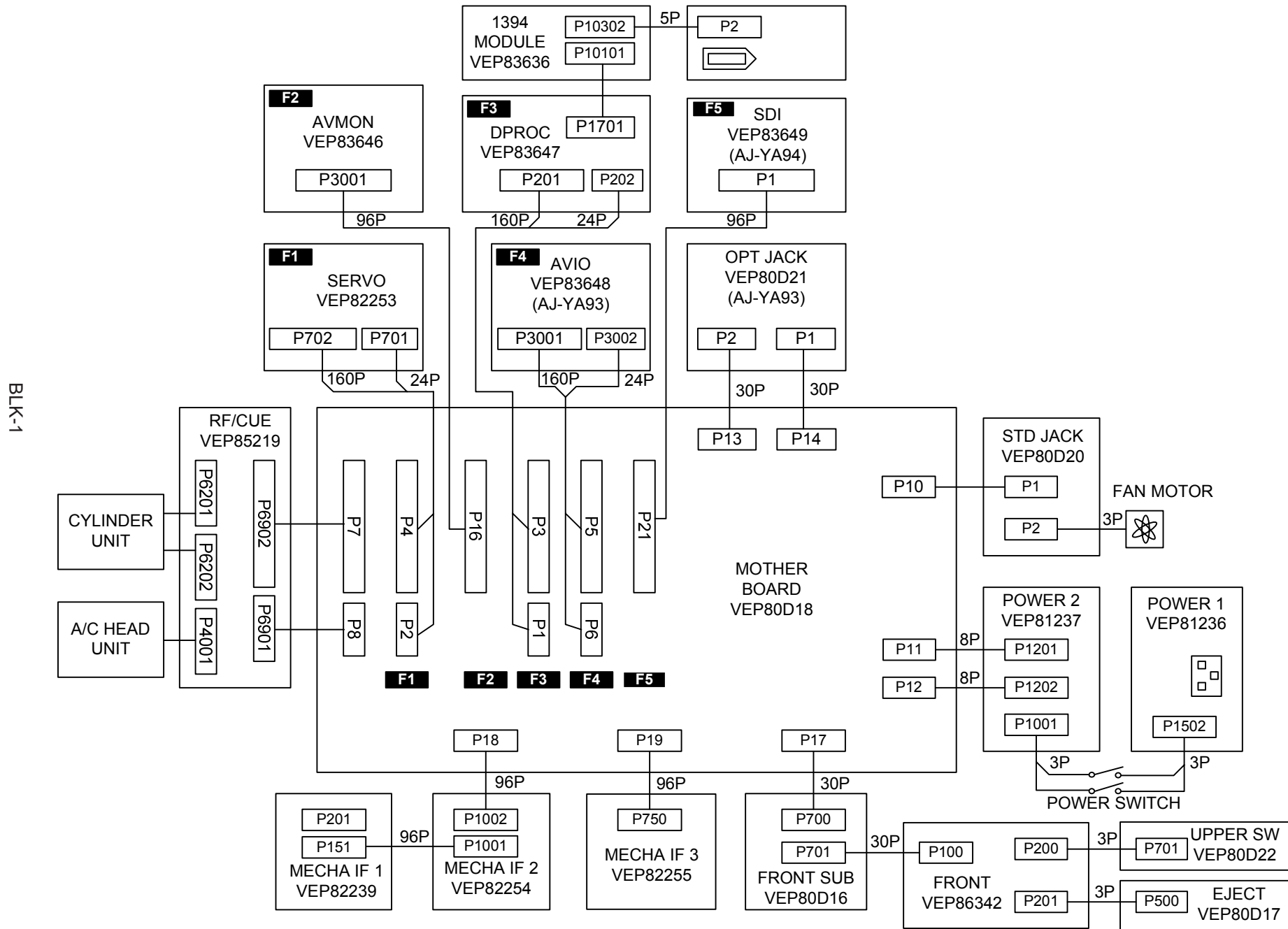
SECTION 5

BLOCK DIAGRAMS

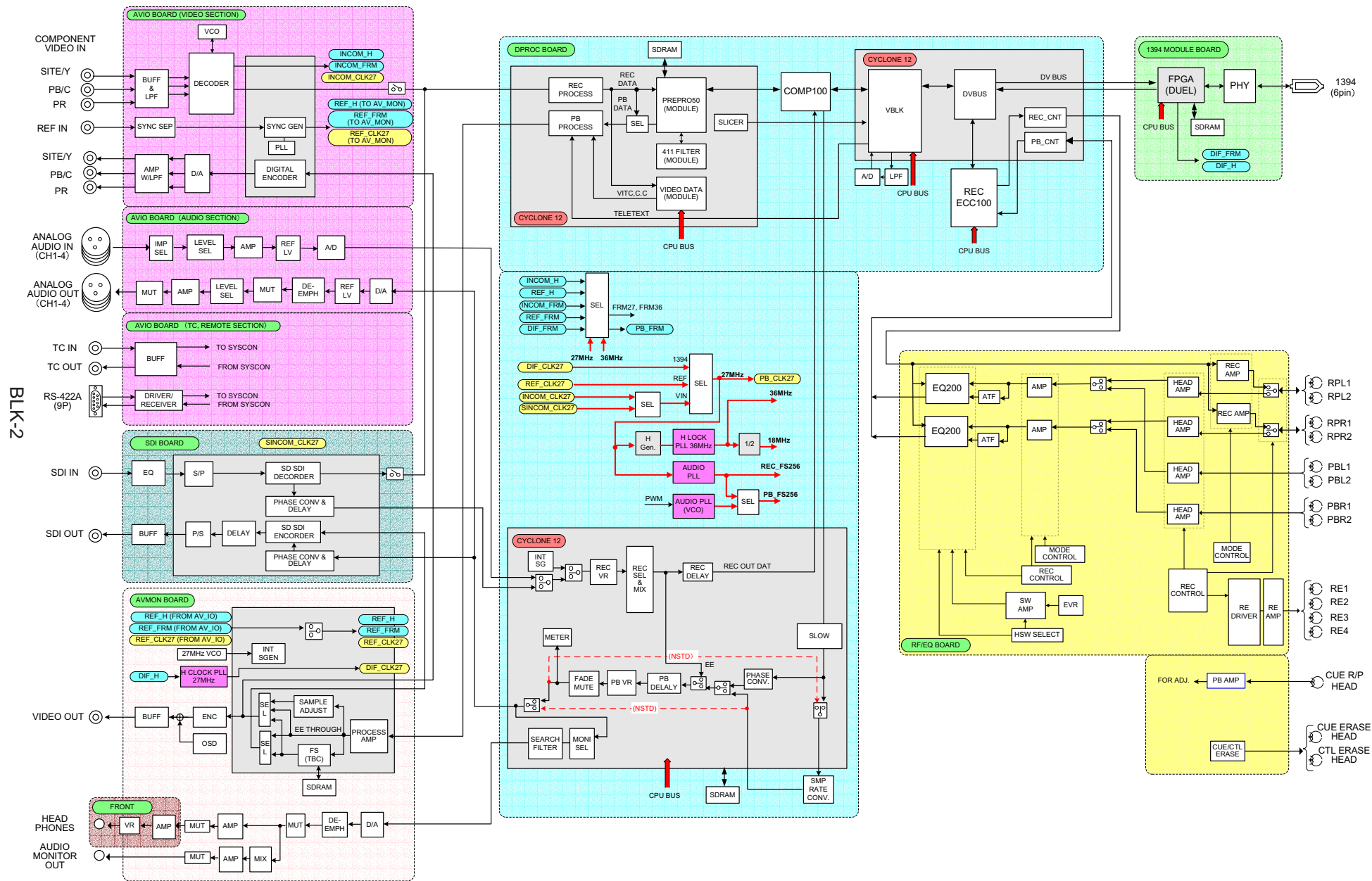
CONTENTS

INTERCONNECTION BLOCK DIAGRAM	BLK-1
VIDEO /AUDIO OVERALL BLOCK DIAGRAM	BLK-2
SERVO (F1) BLOCK DIAGRAM	BLK-3
MECHA IF BLOCK DIAGRAM	BLK-4
AVMON (F2) BLOCK DIAGRAM	BLK-5
DPROC (F3) BLOCK DIAGRAM.....	BLK-6
IEEE1394 MODULE (F3 SUB) BLOCK DIAGRAM	BLK-7
AVIO (F4) BLOCK DIAGRAM	BLK-8
SDI (F5) BLOCK DIAGRAM.....	BLK-9
RF/CUE BLOCK DIAGRAM	BLK-10

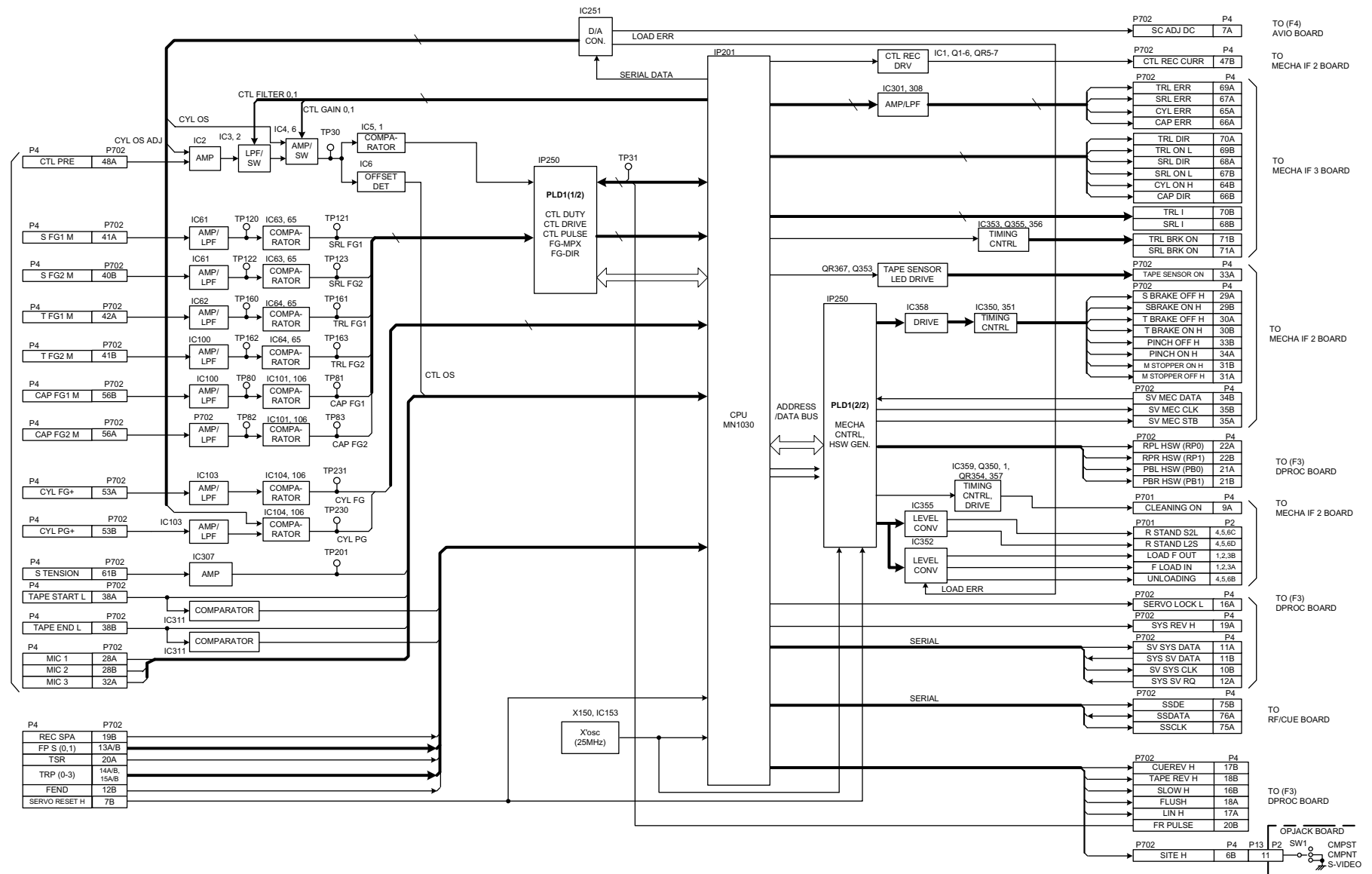
INTERCONNECTION BLOCK DIAGRAM



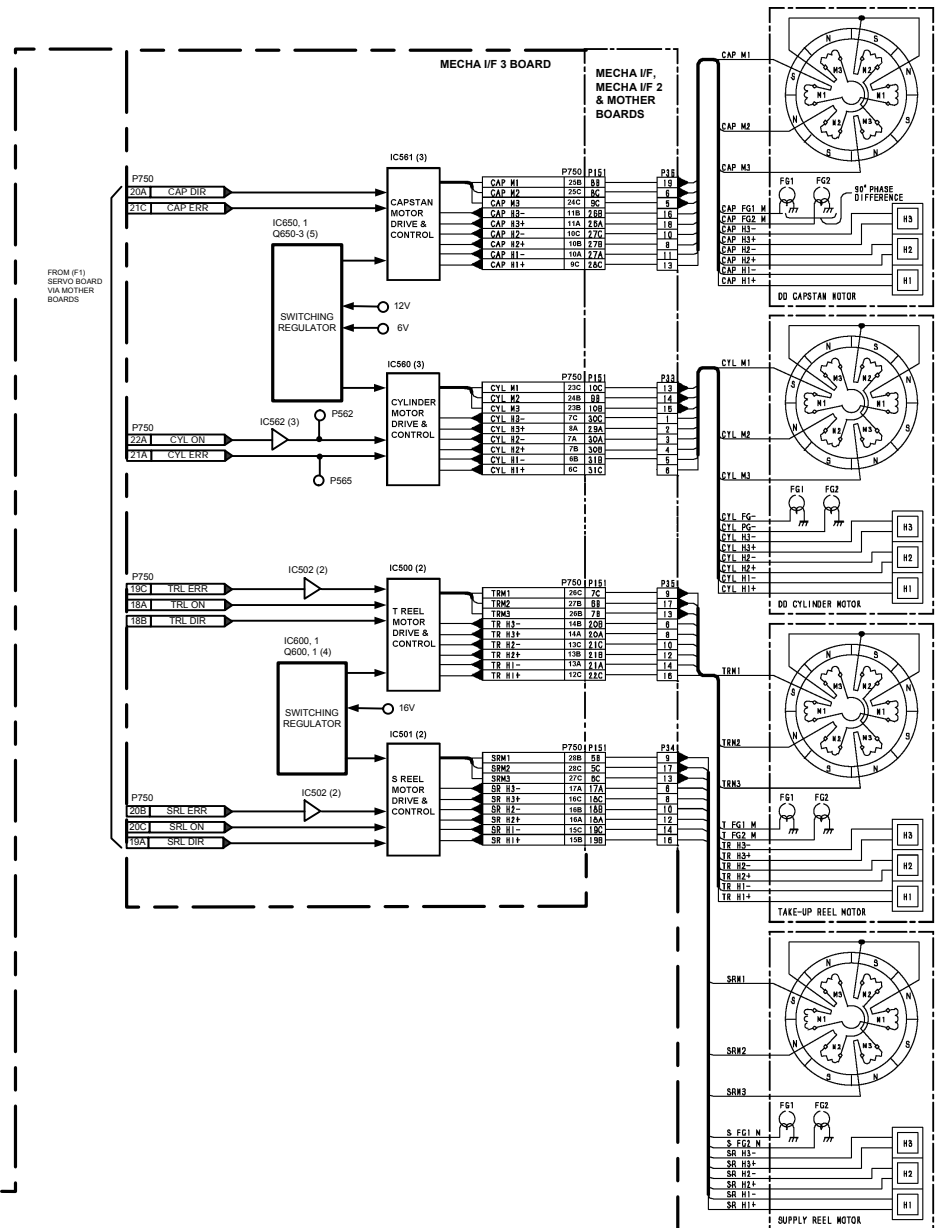
VIDEO / AUDIO OVERALL BLOCK DIAGRAM



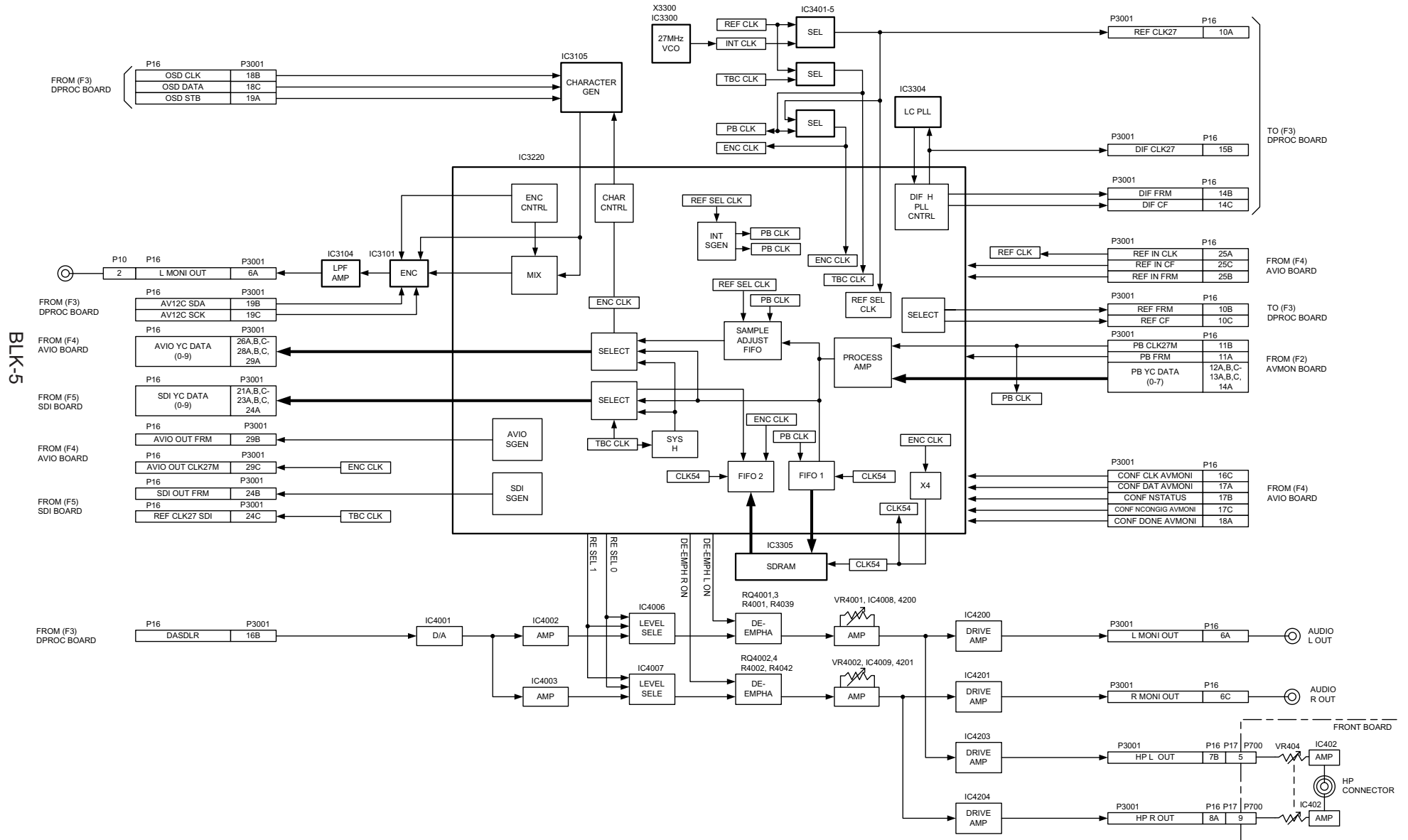
BLK-3



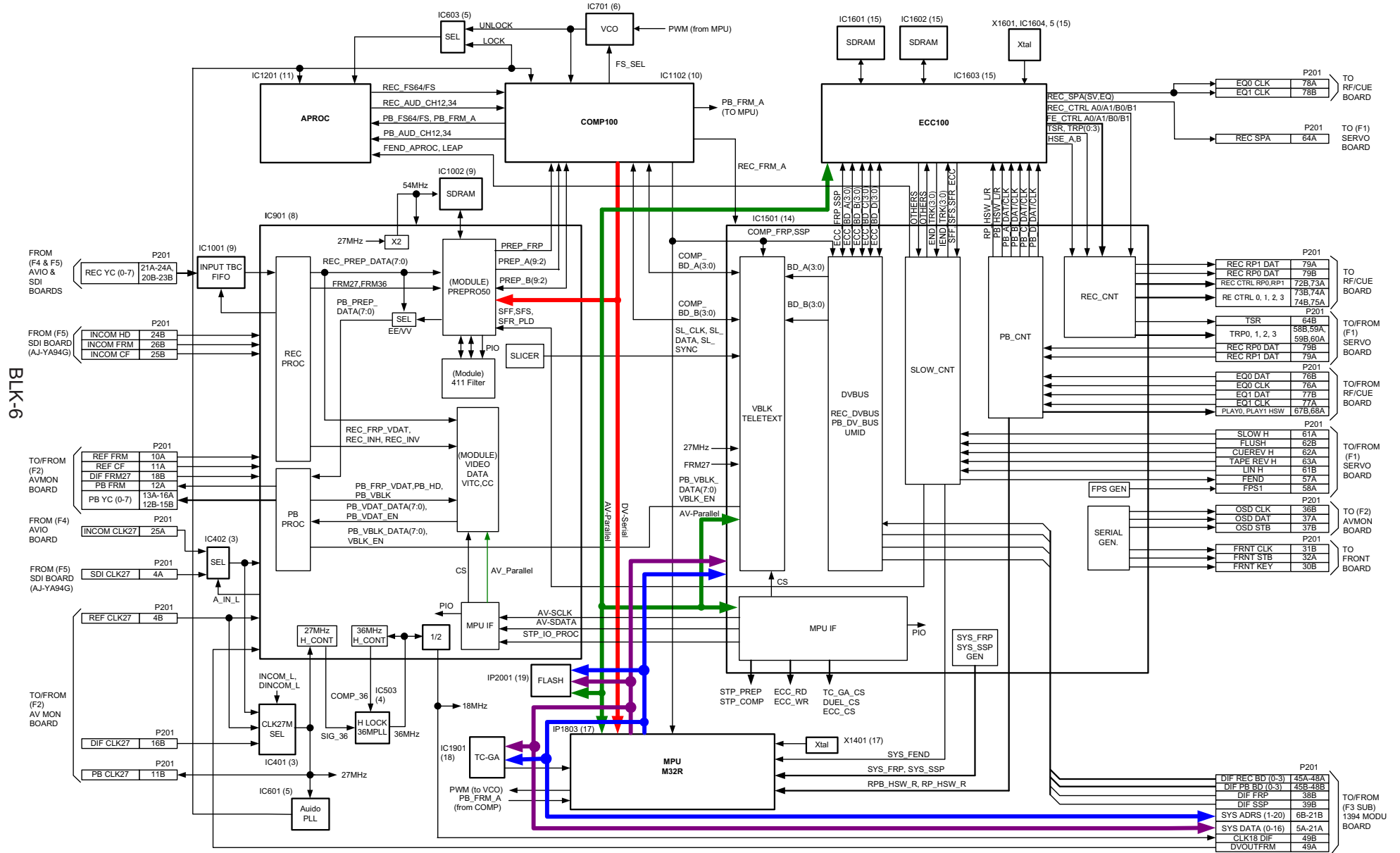
BLK-4



AVMON (F2) BLOCK DIAGRAM

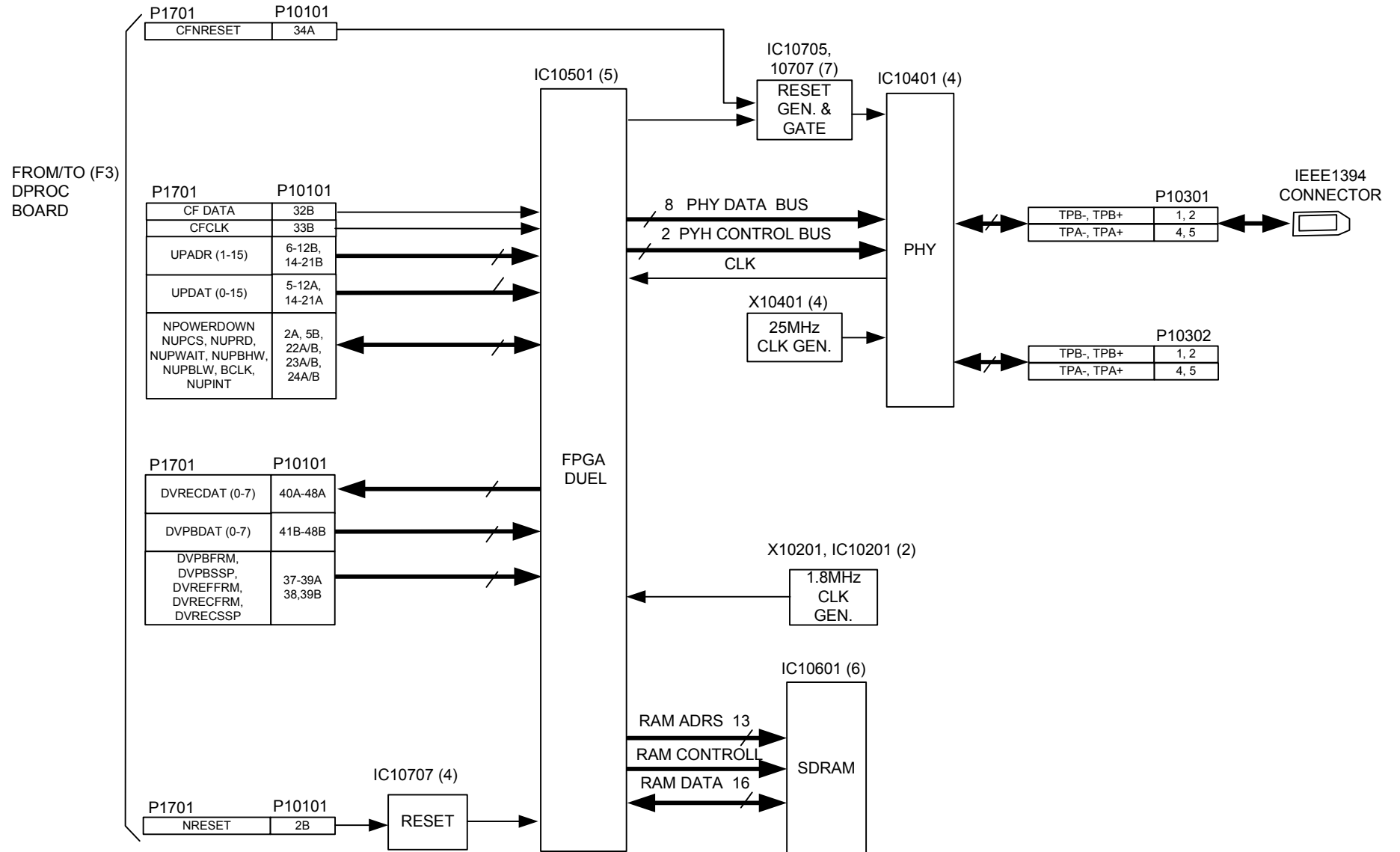


DPROC (F3) BLOCK DIAGRAM



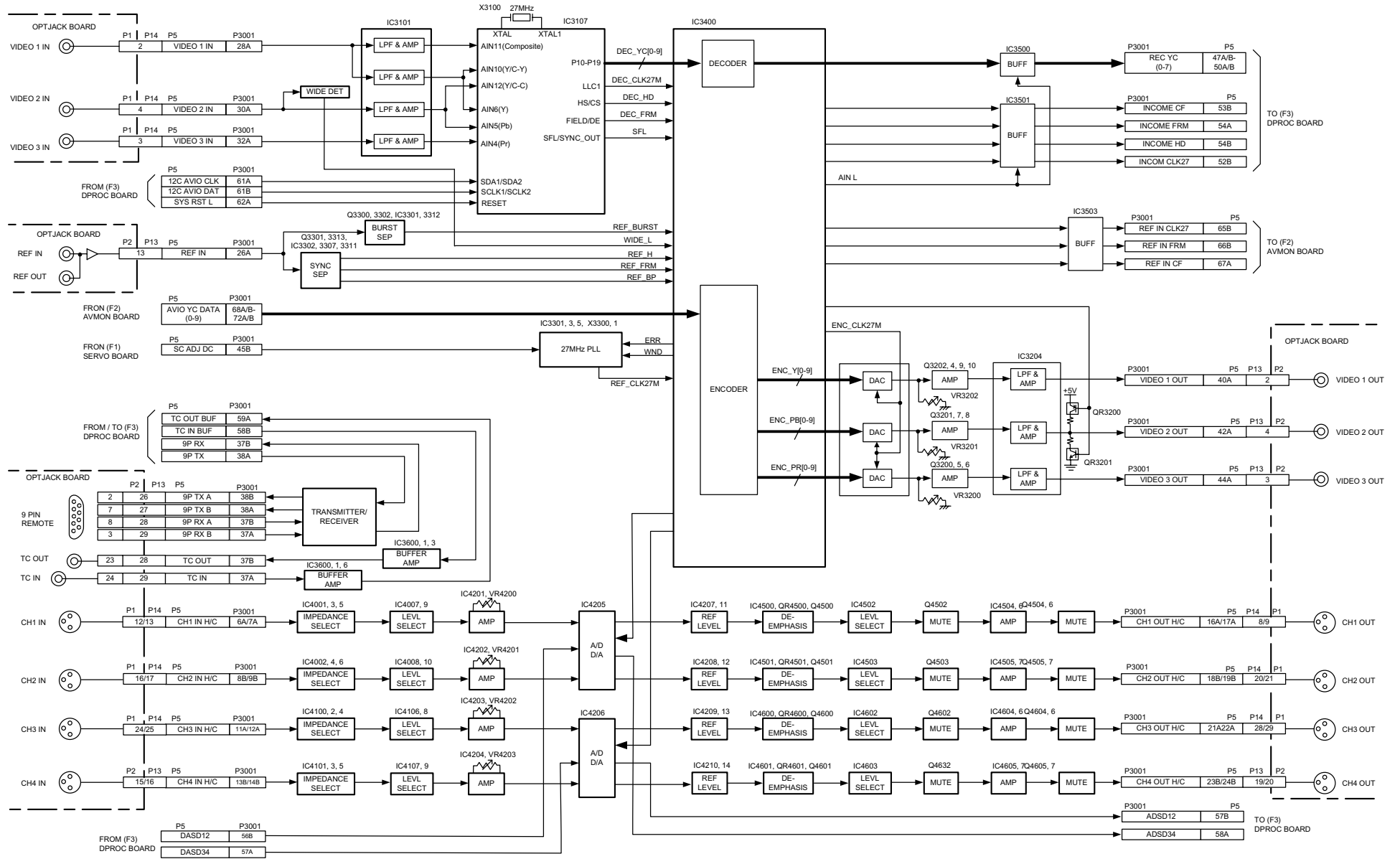
IEEE1394 MODULE (F3 SUB) BLOCK DIAGRAM

BLK-7

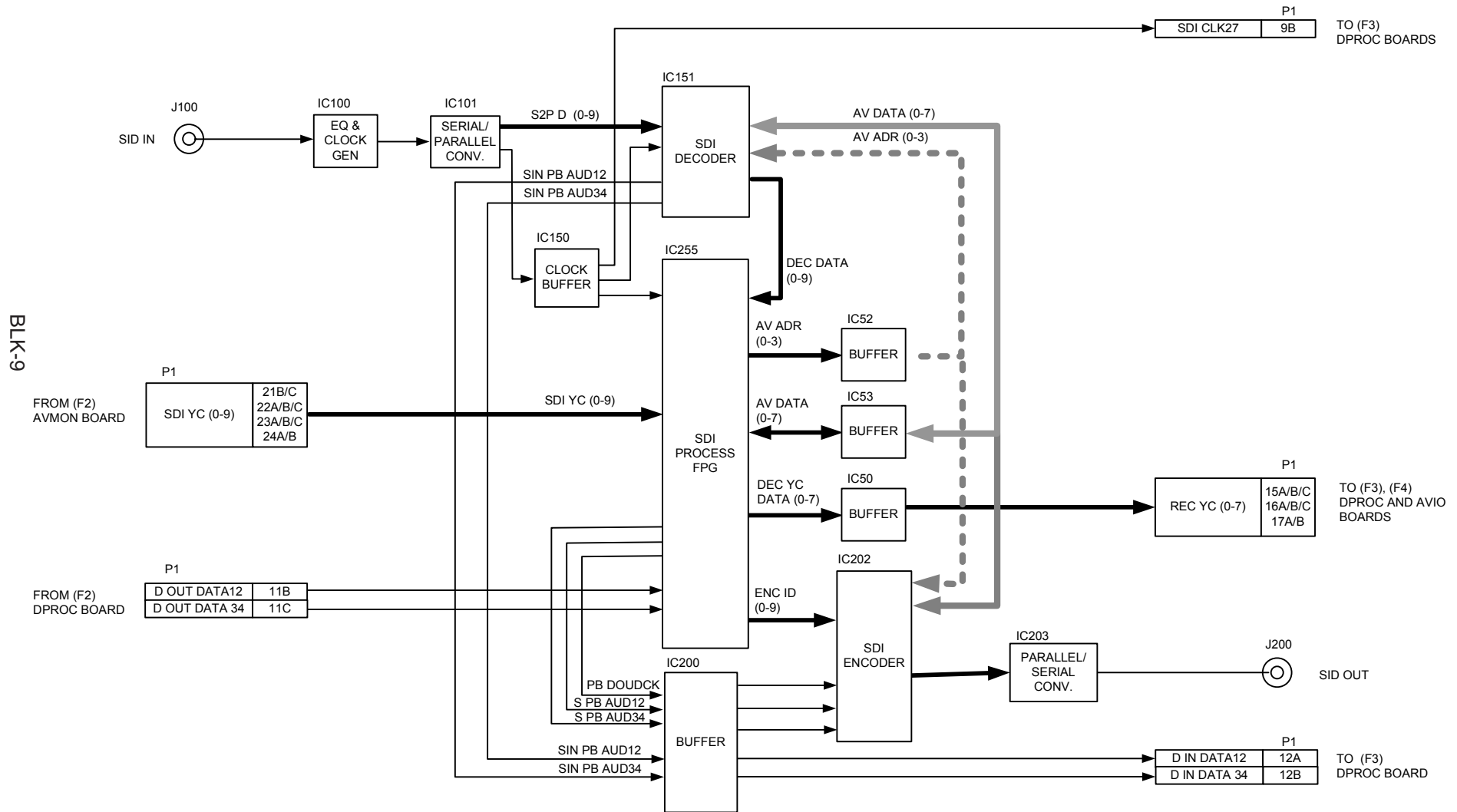


AVIO (F4) BLOCK DIAGRAM

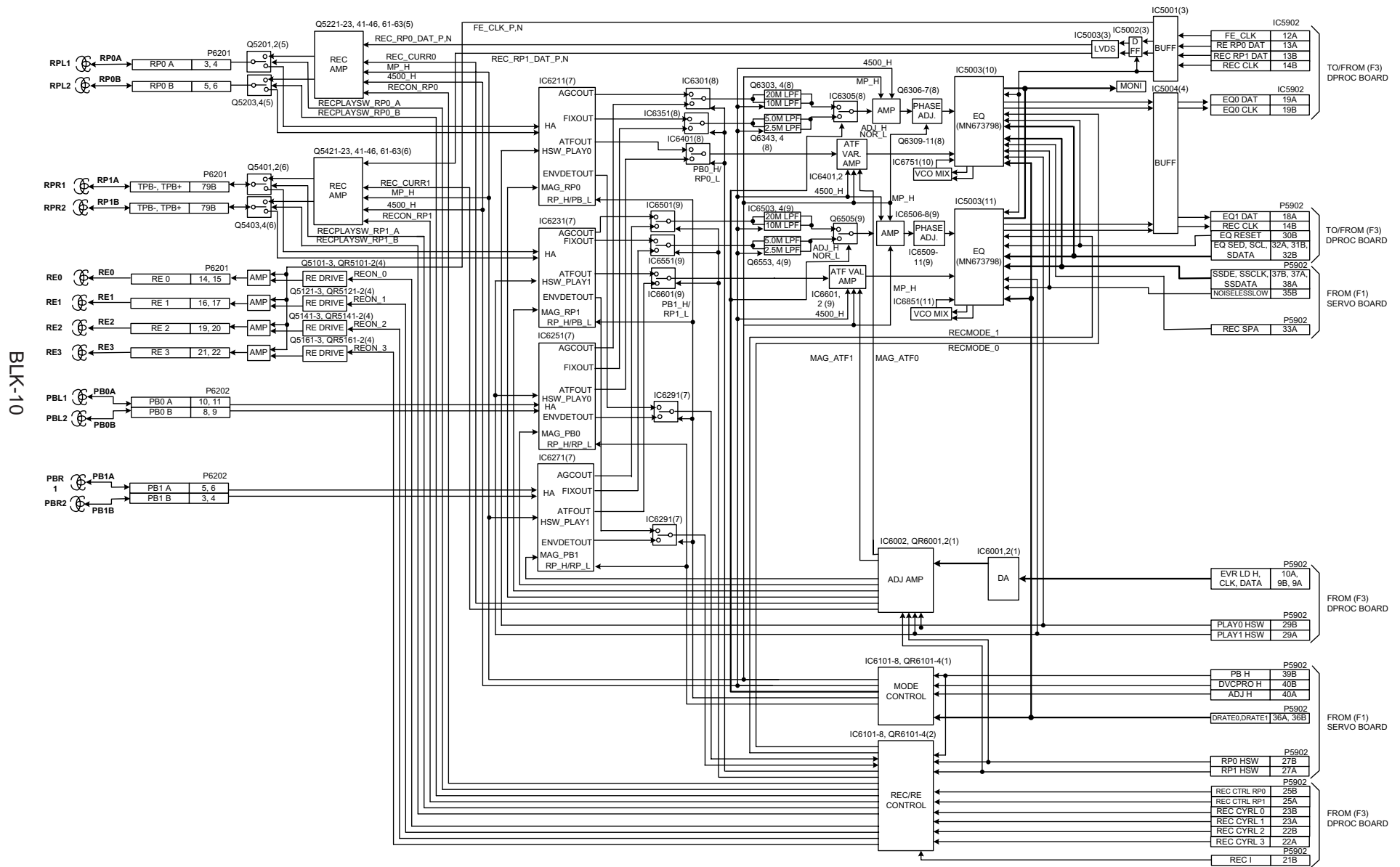
BLK-8



SDI (F5) BLOCK DIAGRAM



RF/CUE BLOCK DIAGRAM



SECTION 7

MAJOR PART LOCATION

NOTE:


DO NOT USE THE PART NUMBER SHOWN ON THIS DRAWING FOR ORDERING. THE CORRECT PART NUMBER SHOWN IN THE PARTS LIST, AND MAY BE SLIGHTLY DIFFERENT OR AMENDED SINCE THIS DRAWING WAS PREPARED.

CAUTION

THE ☐ MARK INDICATES THE PRIMARY CIRCUIT TO DISTINGUISH THE PRIMARY FROM THE SECONDARY CIRCUIT.

PAY ATTENTION NOT TO RECEIVE AN ELECTRIC SHOCK DURING REPAIR AND SERVICE OF THE PRODUCTS.

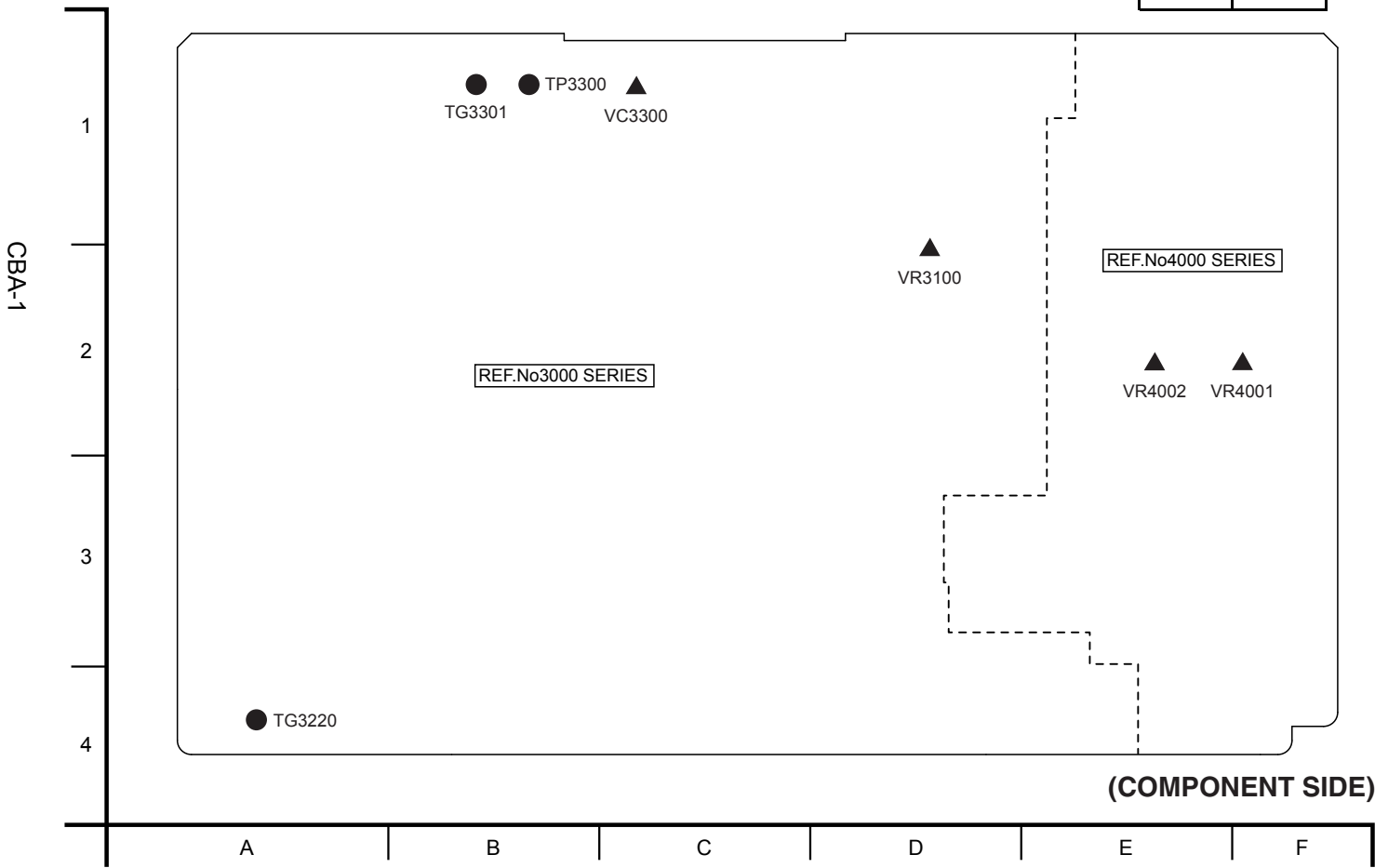
IMPORTANT SAFETY NOTICE:

COMPONENTS IDENTIFIED WITH THE MARK  HAVE THE SPECIAL CHARACTERISTICS FOR SAFETY. WHEN REPLACING ANY OF THESE COMPONENTS, USE ONLY THE SAME TYPE.

CONTENTS

AVNON P.C.B (VEP83646)	CBA-1
POWER2 P.C.B (VEP81237)	CBA-2
RF/CUE P.C.B (VEP85219).....	CBA-3
SERVO P.C.B (VEP82253)	CBA-4
RF/CUE P.C.B (VEP85219).....	CBA-5
FRONT P.C.B (VEP86342).....	CBA-6
MOTHER P.C.B (VEP80D18).....	CBA-7
AVIO P.C.B (VEP83648)	CBA-7
OPTJACK P.C.B (VEP80D21)	CBA-9
DPROC P.C.B (VEP83647)	CBA-10
SDI P.C.B (VEP83649)	CBA-10

AVMON P.C.BOARD (VEP83646) [F2]



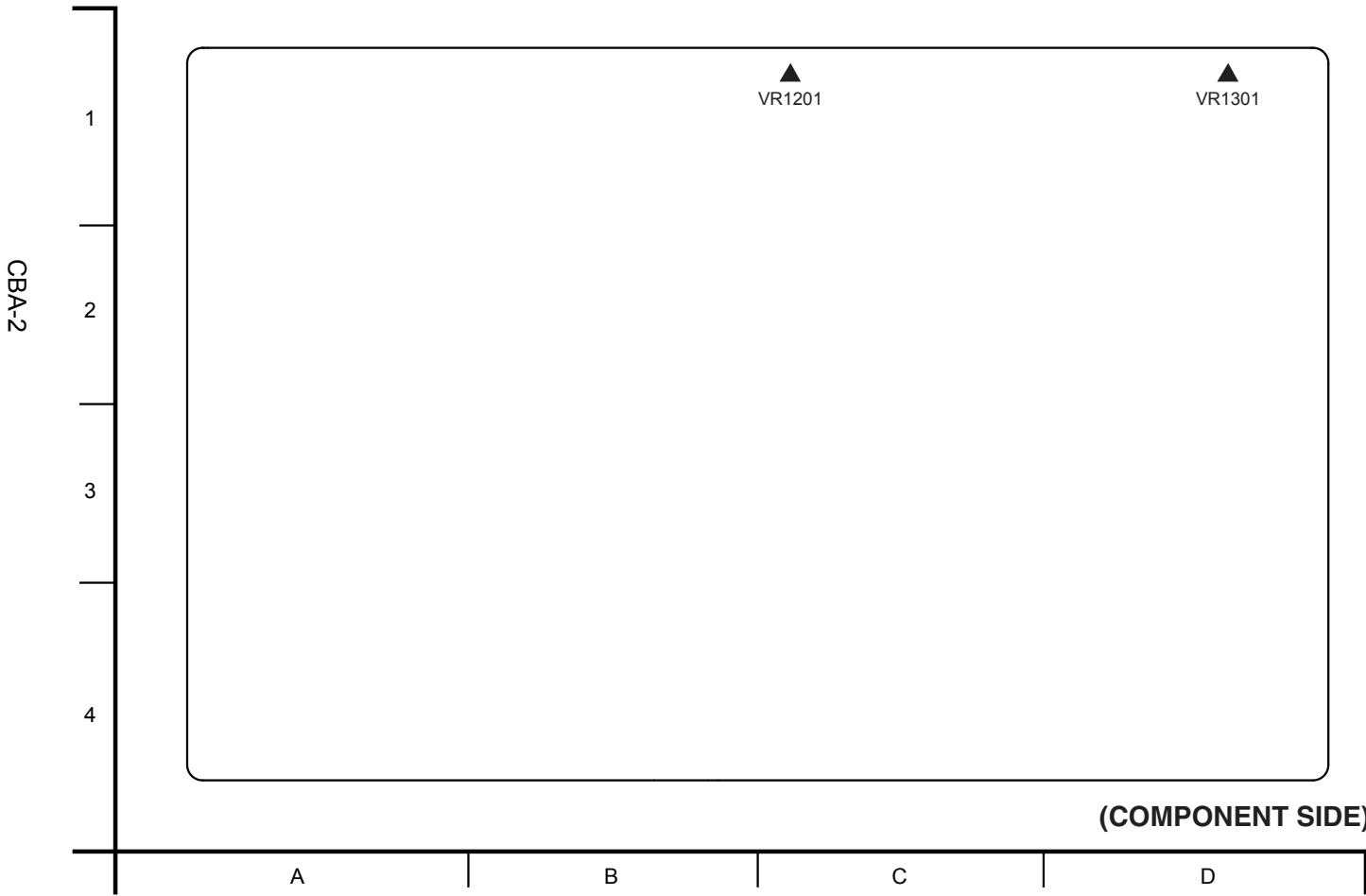
FOIL SIDE

REF	LOC
IC3305	A1
Q4001	F2
Q4002	E2
QR4001	E2
QR4002	E2
QR4003	F2
QR4004	E2

COMPONENT SIDE

REF	LOC	REF	LOC
IC3100	D2	P3001	C4
IC3101	C2		
IC3102	D3	Q3100	D2
IC3103	D2	Q3101	D2
IC3104	D2	Q3102	D2
IC3105	B3	Q3103	D2
IC3200	B2	Q3300	C1
IC3201	A3	Q4200	D3
IC3300	C3	Q4201	D3
IC3301	D1	Q4202	E2
IC3302	B1	Q4203	E3
IC3303	D1	Q4204	E3
IC3304	B1	Q4205	F3
IC3306	C1	Q4206	E3
IC3307	C1	QR4200	E3
IC3400	B2		
IC3401	D3	TG3220	A4
IC3402	D3	TG3301	B1
IC3403	C3	TP3300	B1
IC3404	C3		
IC3405	D3	VC3300	C1
IC4001	E1	VR3100	D2
IC4002	F1	VR4001	F2
IC4003	E1	VR4002	E2
IC4004	E2		
IC4005	E2		
IC4006	F1		
IC4007	E1		
IC4008	F2		
IC4009	E2		
IC4200	F3		
IC4201	E3		
IC4203	E3		
IC4204	E3		

POWER2 P.C.BOARD (VEP81237)



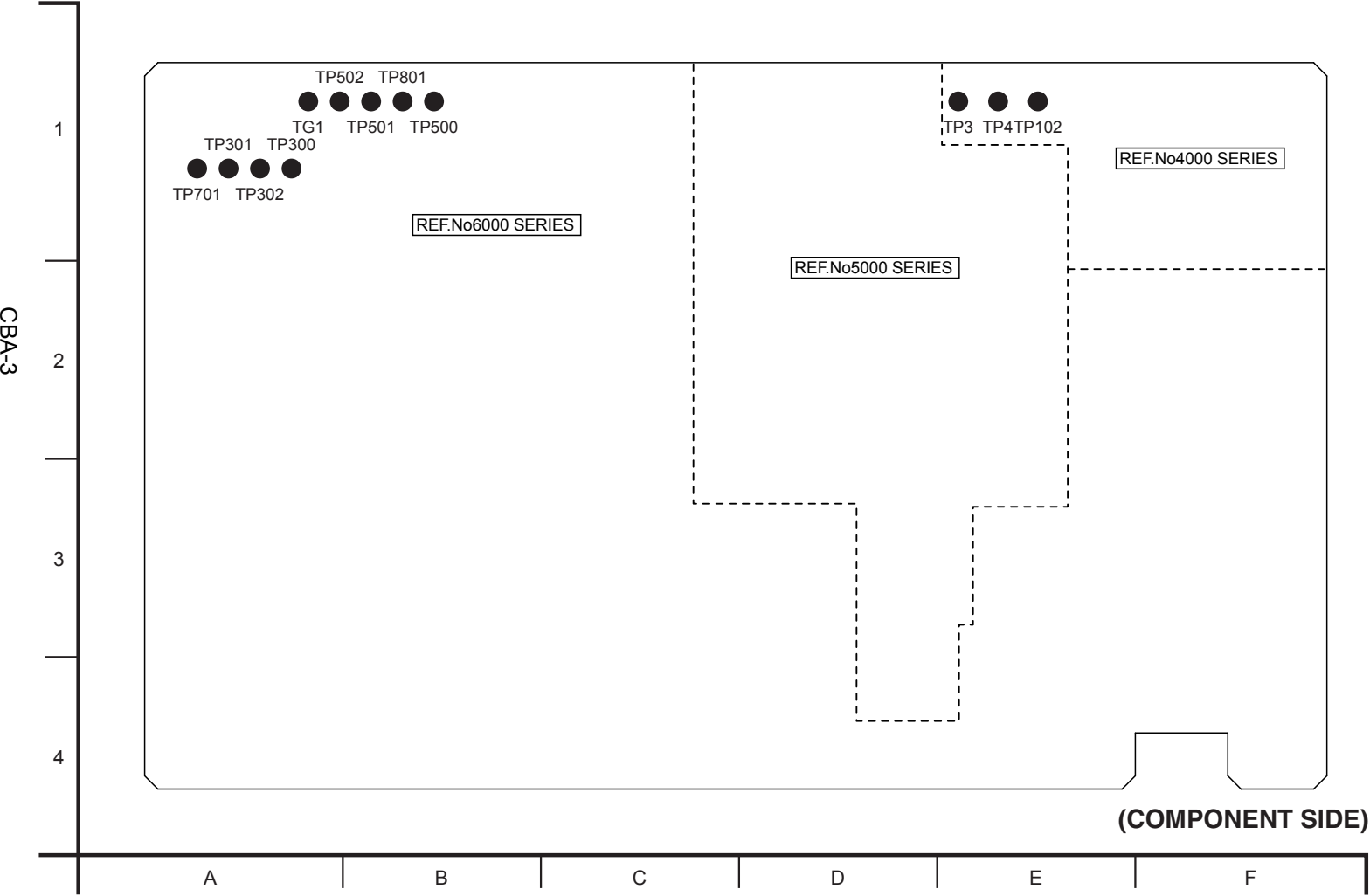
COMPONENT SIDE

REF	LOC
IC1001	A1
IC1201	C1
IC1202	D2
IC1203	B4
P1001	A4
P1201	D4
P1202	C4
Q1001	B2
Q1205	B1
Q1206	B1
VR1201	C1
VR1301	D1

FOIL SIDE

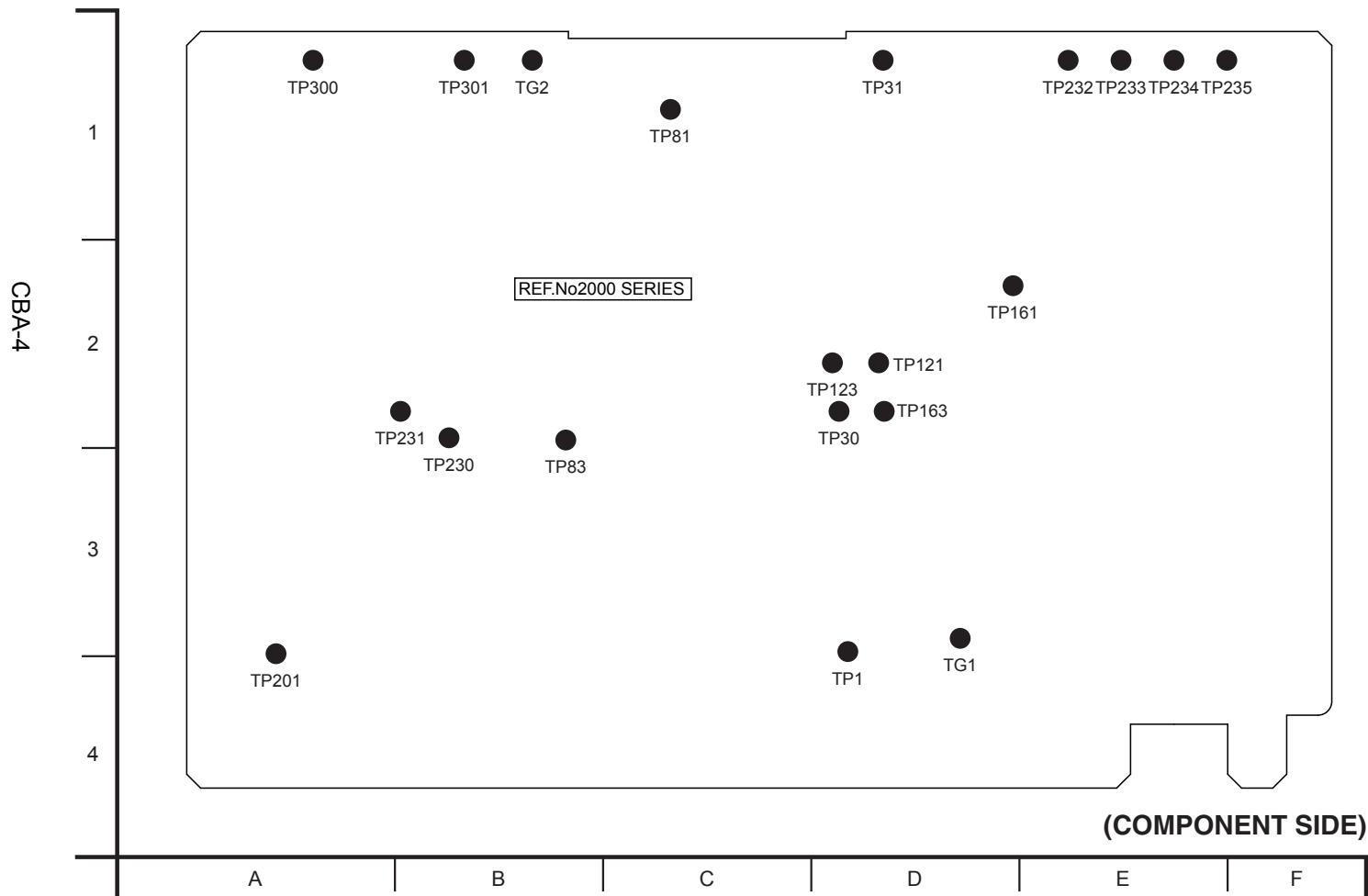
REF	LOC
IC1204	C4
IC1206	B3
IC1207	B3
IC1301	A1
IC1302	A3
Q1202	C4
Q1203	C4
Q1204	C4
QR1001	C2
QR1201	C4
QR1202	C4
QR1203	C4
QR1204	C4

RF/CUE P.C.BOARD (VEP85219)



REF	LOC	REF	LOC	REF	LOC
IC4001	E1	Q5123	D1	Q6504	B2
IC5001	D4	Q5142	D1	Q6505	B2
IC5002	D3	Q5143	E1	Q6506	B3
IC5003	E3	Q5162	E1	Q6508	B3
IC5004	D4	Q5163	E1	Q6509	B3
IC5101	D2	Q5201	D2	Q6510	B3
IC5102	E2	Q5202	D2	Q6511	B3
IC6003	E4	Q5203	D2	Q6551	B2
IC6004	E4	Q5204	D2	Q6552	B2
IC6005	E4	Q5221	D2	Q6553	B2
IC6006	E4	Q5224	D2	Q6554	B2
IC6007	E3	Q5261	D2	Q6601	B2
IC6101	D3	Q5262	D2	Q6602	B2
IC6102	D3	Q5263	D2	Q6751	B4
IC6103	D3	Q5401	D2	Q6771	A4
IC6104	D3	Q5402	D2	Q6851	C3
IC6105	D3	Q5403	D3	Q6871	B4
IC6106	D3	Q5404	D2	QR5101	D2
IC6107	C4	Q5421	D2	QR5102	D2
IC6108	C3	Q5424	D2	QR5121	D2
IC6109	C3	Q5461	D2	QR5122	D2
IC6301	A3	Q5462	D2	QR5141	D2
IC6401	A2	Q5463	D2	QR5142	D2
IC6402	A3	Q6301	A2	QR5161	E2
IC6501	B3	Q6302	A2	QR5162	E2
IC6601	B2	Q6303	A2	QR5261	E2
IC6602	B3	Q6304	A2	QR5461	E2
IC6751	B3	Q6305	A2	QR6291	C3
IC6851	C3	Q6306	A3	QR6292	C3
IC6903	F3	Q6308	A3		
IC6907	F2	Q6309	A3	TG6001	A1
		Q6310	A3	TP4003	E1
P4001	E1	Q6311	A3	TP4004	E1
P6201	C1	Q6351	A2	TP4102	E1
P6202	B1	Q6352	A2	TP6300	A1
P6901	F4	Q6353	A2	TP6301	A1
P6902	D4	Q6354	A2	TP6302	A1
		Q6401	A2	TP6500	B1
Q4001	F1	Q6402	A2	TP6501	B1
Q5102	D1	Q6501	B2	TP6502	A1
Q5103	D1	Q6502	B2	TP6701	A1
Q5122	D1	Q6503	B2	TP6801	B1

SERVO P.C.BOARD (VEP82253) [F1]



REF	LOC	REF	LOC	REF	LOC
IC1	D3	IC308	A3	QR150	B2
IC2	C3	IC309	A4	QR151	C2
IC3	C3	IC310	A3	QR152	B2
IC4	C3	IC311	A2	QR153	B2
IC5	C2	IC350	E1	QR351	E1
IC6	C3	IC351	E1	QR352	E1
IC60	A3	IC352	E3	QR358	E2
IC61	C3	IC353	E1	QR362	E2
IC62	B3	IC354	E1		
IC63	C3	IC355	F3	TG1	D3
IC64	B3	IC357	F2	TG2	B1
IC65	C2	IC358	E2	TP1	D3
IC100	A3	IC359	E2	TP30	D2
IC101	A3	IP150	B2	TP31	D1
IC102	B3	IP250	D1	TP81	C1
IC103	B3			TP83	B2
IC104	B3	P1	E3	TP121	D2
IC105	B3	P2	C4	TP123	D2
IC106	B3	P151	A1	TP161	D2
IC151	A1	P250	D1	TP163	D2
IC153	A1			TP201	A3
IC251	C1	Q1	D3	TP230	B2
IC252	C1	Q2	D3	TP231	B2
IC253	E1	Q3	D3	TP232	E1
IC300	E4	Q4	D3	TP233	E1
IC301	E4	Q350	E2	TP234	E1
IC302	A4	Q351	E2	TP235	E1
IC303	E3	Q353	E2	TP300	A1
IC304	E3	Q354	E3	TP301	B1
IC306	D3	Q355	E2		
IC307	A3	Q356	E2		

RF/CUE P.C.BOARD (VEP85219)

FOIL SIDE

REF	LOC	REF	LOC
IC4002	F1	QR4001	F1
IC6001	E4	QR4002	F1
IC6002	E4	QR6001	C4
IC6110	D4	QR6002	C4
IC6211	C2	QR6003	D4
IC6231	C2	QR6101	C3
IC6251	B1	QR6102	C3
IC6271	B1	QR6103	D3
IC6291	C2	QR6104	C3
IC6702	A3		
IC6802	B3		
IC6901	F2		
IC6902	F3		
IC6904	E2		
IC6905	E2		
IC6906	F2		
Q4002	F1		
Q5101	D2		
Q5121	D2		
Q5141	D2		
Q5161	E2		
Q5241	E2		
Q5242	E2		
Q5243	E2		
Q5244	D2		
Q5245	D2		
Q5246	E2		
Q5441	E2		
Q5442	E2		
Q5443	E2		
Q5444	D2		
Q5445	D2		
Q5446	E2		
Q6307	A3		
Q6403	A3		
Q6507	B3		
Q6603	B3		

SERVO P.C.BOARD (VEP82253) [F1]

FOIL SIDE

REF	LOC
IC154	C2
IC155	C1
IC156	C2
IC356	E2
Q5	D3
Q6	D3
Q352	E2
QR1	C3
QR2	C3
QR3	C3
QR4	C3
QR5	D3
QR6	D3
QR7	D3
QR154	A1
QR350	E1
QR353	F2
QR354	E2
QR357	E2
QR359	E2
QR360	E2
QR361	E2
QR363	E2
QR364	E2
QR365	E1
QR366	E1
QR367	E2
QR368	E1

[illegible]

REF	LOC	REF	LOC
IC300	D2	SW211	G3
		SW212	G3
P100	C2	SW213	D3
		SW214	E3
SW200	A2	SW215	E3
SW201	A2	SW216	E3
SW202	G2	SW217	F3
SW203	G2	SW218	D3
SW204	F2		
SW205	G2	VR200	G1
SW206	G2	VR400	B3
SW207	F2	VR401	B3
SW208	F1	VR402	C3
SW209	F3	VR403	C3
SW210	F3	VR404	A3



CBA-7

CBA-7

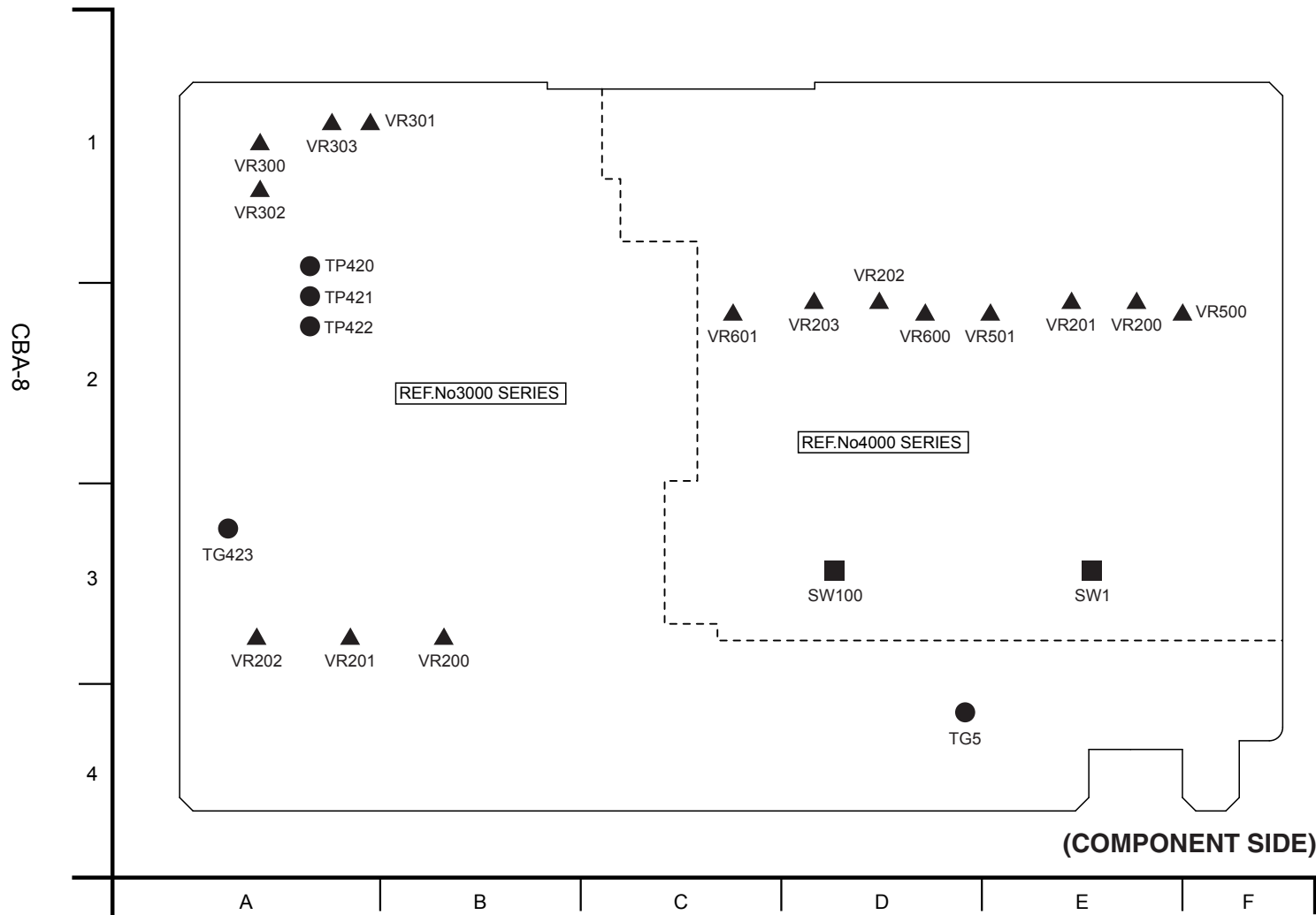
FOIL SIDE

REF	LOC
Q560	D4
Q562	D4
Q564	D4
Q565	D4
Q600	D6
Q601	D6
Q650	D5
Q651	C5
Q652	C5
Q653	D5
Q700	C3
Q702	C3
Q703	C3
Q704	B3
QR600	B6
QR601	B6

FOIL SIDE

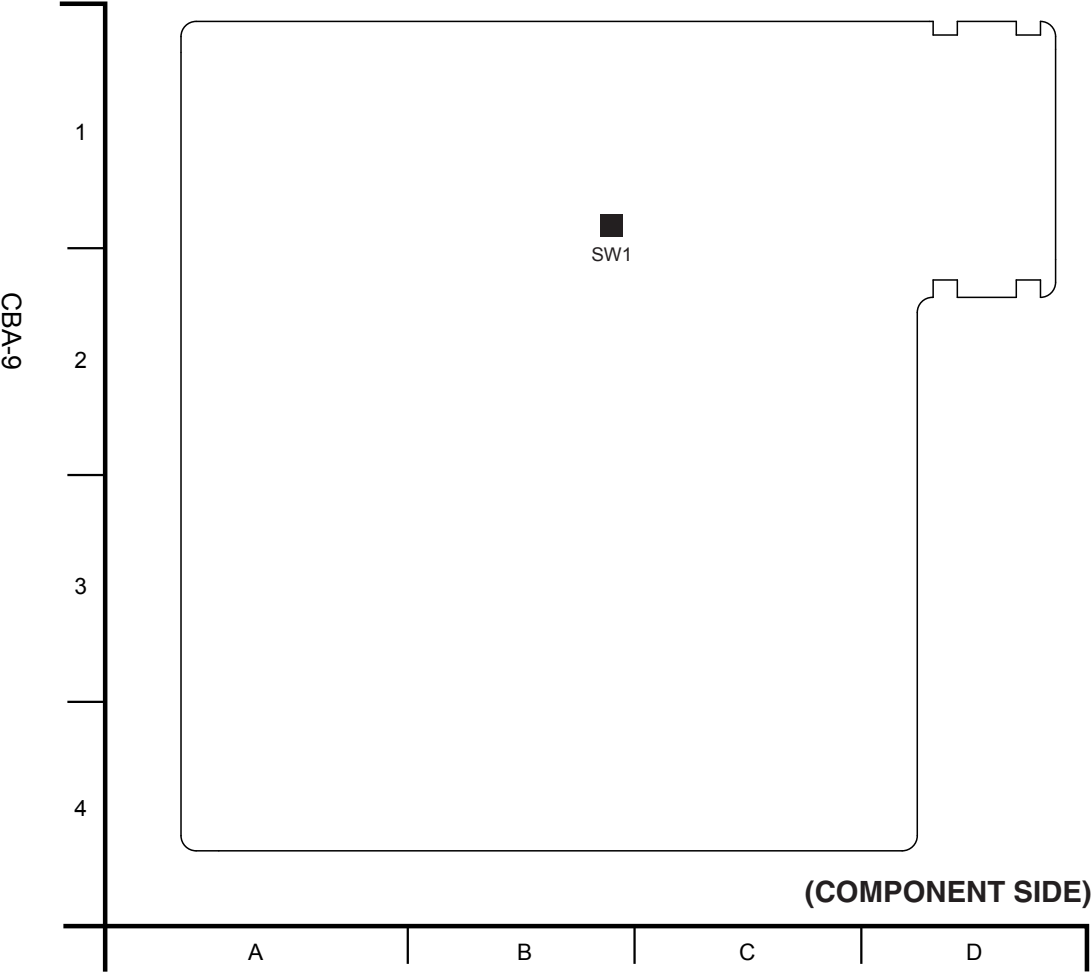
REF	LOC	REF	LOC
IC3100	C3	Q4500	F1
IC3205	A3	Q4501	E1
IC3301	A1	Q4502	F2
IC3305	A1	Q4503	E2
IC3310	A1	Q4504	F3
IC3313	B1	Q4505	E3
IC3600	B3	Q4600	D1
IC4001	E3	Q4601	C1
IC4002	E3	Q4602	D2
IC4005	E2	Q4603	C2
IC4006	E2	Q4604	D3
IC4007	E2	Q4605	C3
IC4008	E2	QR3100	C3
IC4100	D3	QR4500	E1
IC4101	D3	QR4501	E1
IC4104	D2	QR4600	D1
IC4105	D2	QR4601	C1
IC4106	D2		
IC4107	D2		
IC4201	E2		
IC4202	E2		
IC4203	D2		
IC4204	D2		
IC4500	F2		
IC4501	E2		
IC4504	F2		
IC4505	E2		
IC4600	D2		
IC4601	C2		
IC4604	D2		
IC4605	C2		
Q3205	B3		
Q3207	A3		
Q3209	A3		
Q3302	C1		
Q4402	C3		
Q4403	C3		

AVIO P.C.BOARD (VEP83648) [F4]



REF	LOC	REF	LOC	REF	LOC
IC3101	C3	IC4102	D2	Q3204	A3
IC3102	B3	IC4103	D2	Q3206	B3
IC3103	B3	IC4108	D2	Q3208	A3
IC3104	B3	IC4109	D2	Q3210	A3
IC3105	B2	IC4200	C1	Q3300	C2
IC3106	B2	IC4205	E1	Q3301	C1
IC3107	C2	IC4206	D1	Q3303	B1
IC3200	A3	IC4207	F1	Q4400	F3
IC3201	A4	IC4208	E1	Q4401	F2
IC3202	A4	IC4209	D1	Q4506	F3
IC3203	A3	IC4210	C1	Q4507	E3
IC3204	B4	IC4211	F1	Q4606	D3
IC3300	B1	IC4212	E1	Q4607	C3
IC3302	C1	IC4213	D1		
IC3303	B1	IC4214	C1	SW4001	E3
IC3304	B1	IC4400	E1	SW4100	D3
IC3307	B1	IC4401	E1		
IC3308	B2	IC4402	D1	TG3005	D4
IC3309	A1	IC4403	D1	TG3423	A3
IC3311	B1	IC4404	C1	TP3420	A1
IC3312	B1	IC4405	F1	TP3421	A2
IC3314	A1	IC4406	E1	TP3422	A2
IC3315	B1	IC4407	D1		
IC3400	A2	IC4408	C1	VR3200	B3
IC3401	A2	IC4409	D1	VR3201	A3
IC3500	B3	IC4502	F2	VR3202	A3
IC3501	B2	IC4503	E2	VR3300	A1
IC3502	B2	IC4506	F3	VR3301	A1
IC3503	B2	IC4507	E3	VR3302	A1
IC3504	B3	IC4602	D2	VR3303	A1
IC3601	C4	IC4603	C2	VR4200	E2
IC3602	C4	IC4606	D3	VR4201	E2
IC3603	B3	IC4607	C3	VR4202	D2
IC3604	B3			VR4203	D2
IC3605	C4	P3001	C4	VR4500	F2
IC3606	C3	P3002	E3	VR4501	E2
IC4003	E2			VR4600	D2
IC4004	E2	Q3200	B3	VR4601	C2
IC4009	E2	Q3201	A3		
IC4010	E2	Q3202	A3		

OPTJACK P.C.BOARD (VEP80D21)



COMPONENT SIDE	
REF	LOC
P1	A4
P2	B4
P3	D1
SW1	B1

FOIL SIDE	
REF	LOC
IC100	B2
IC101	B1
Q100	B1

DPROC P.C.BOARD (VEP83647)

COMPONENT SIDE

REF	LOC
IC302	F1
IC303	A4
IC305	F3
IC306	E3
IC307	E3
IC401	D4
IC402	D4
IC406	D4
IC502	E3
IC506	D3
IC603	E3
IC701	F2
IC703	D3
IC901	E2
IC1102	C3
IC1103	C4
IC1201	D1
IC1401	D2
IC1402	D2
IC1501	A3
IC1603	A2
IC1604	A3
IC1606	B1
IC1801	D1
IC1802	C1
IC1901	C1
IC2107	B3
P201	C4
P202	E3
P1701	B2
P1802	A1

FOIL SIDE

REF	LOC
IC403	D3
IC405	D3
IC501	E3
IC503	E3
IC505	C3
IC601	F3
IC602	E3
IC702	E3
IC801	B4
IC803	A4
IC805	B3
IC806	B4
IC1001	E3
IC1002	F2
IC1301	E1
IC1601	A1
IC1602	A2
IC1605	A2
IC1808	B1
IC2101	D1
IC2102	D2
IC2103	D2
IC2106	A2
IC2108	B1
IP1803	C1
IP2001	C3
IP2002	C2

SDI P.C.BOARD (VEP83649)

COMPONENT SIDE

REF	LOC
IC1	A3
IC2	D3
IC4	A3
IC50	B3
IC51	B3
IC100	E1
IC101	E1
IC151	C1
IC202	D2
IC203	E2
IC255	C2
P1	B4

FOIL SIDE

REF	LOC
IC52	C2
IC53	C2
IC150	D1
IC200	D2
IC201	D2
IC300	E3
IC302	E2
Q300	E3
Q301	E3
Q302	E3
Q303	E3
Q304	E3
TG2	D3